

Chapter 2

ROAD ACCIDENTS

Road traffic accidents have become an established major epidemic today in India. Although we are facing so many serious problems in our lives directly attributable to increased road traffic, accidents represent the most severe of them all. This probably justifies discussing road traffic accidents on a priority basis. India has the largest number of deaths in road accidents in the world. In India, road traffic accidents claim more than one lakh lives per year [1,14,590 in 2007]. On an average, there is one serious accident every minute and a death every five minutes in road accidents. If we analyse all the causes of mortality in the age group of 5-45 years in our country, road accidents are next only to tuberculosis and AIDS. More than 50% deaths in road accidents occur in the young [15-45 years] who represent the most productive age group.

When we compare it with other types of violent deaths, we find that the number of deaths owing to road accidents is significantly high. For example, in India, deaths in road accidents are 3.5 times more than the total number of deaths occurring owing to homicide. Similarly, in 2007 only two people died every day in terrorist related activities in India while in the same year road accidents claimed 314 casualties everyday. As regards war, it is not a common phenomenon, but as per the world average, death rates in road accidents are seven times bigger than those occurring owing to wars. So you can very well understand where the actual war is raging, on our borders or on our roads. However, unfortunately, this problem of road accidents is not receiving the attention as per those terms.

[I] THE SOCIAL IMPACT

In case of accidental deaths, the quality of life of the dependents deteriorates significantly. In more than 90% cases family members [especially those belonging to middle or poor classes] are forced to live a miserable life. Death is not the only indicator of the seriousness of the problem. Those who survive accidents may have to face many kinds of problems like permanent disability, loss of limb and so on. For every death that occurs there are four people who get permanently disabled and 15 persons who sustain serious injuries. They have to bear an enormous financial burden of prolonged medical treatment as presently only 1%

of the Indian population has medical insurance. This financial burden coupled with the fact that there is no constant source of income, affects the quality of life of even a higher class family. In fact, the entire family of the disabled person is adversely affected. Other family members have to devote more time to the victim's care affecting their profession as well. Even if the person resumes his/her job, his efficiency may suffer a set-back owing to disability.

A physical disability may prove to be disastrous especially for the people like farmers, labourers, etc who depend mainly on physical activity or fitness for livelihood. Children's life and education may be affected either directly as in the case of injury they have to drop out from school, or indirectly when the sole-earning member meets with an accident and cannot afford to pay the school fees. In some cases children's quality of education may suffer as they may have to shift to a less reputable institution. All this is in addition to the emotional or psychological trauma undergone by the kith and kin. Some of the survivors may suffer a life-long anxiety or fear of roads or speed or may even go into depression.

[III] ROAD ACCIDENTS: A HEALTH ISSUE?

It has not been clearly defined which department or ministry should really deal with the issue of road accidents. Whether it is more a transportation, civil, automobile engineering issue or an issue related with the traffic or health authorities, is yet to be defined. Owing to this unfortunate fact, the problem of road accidents resembles an orphan who nobody likes to claim. This is also responsible for the blame game amongst the various authorities. That is why, despite being an alarming and grave situation, it is not getting the understanding and attention it deserves.

I, as a medical professional, feel that it is mainly a public health issue as it is directly responsible for a very high number of deaths, disability and serious injuries mentioned earlier. Besides this, indirect factors like vehicular air pollution which lead to about 5,27,700 premature deaths in India every year, are sufficient proof to show that this issue belongs entirely to preventive and social medicine. The next question is, if it is basically a health issue, then how does it differ from other health problems that we are facing in our lives? There are some special features of road accidents that make them different from the other health problems that prevail.

1. Failing to do our best: When an accident occurs to your close one, often either you do not know or come to know very late. There is a horrifying possibility that the person might be having very severe injuries and may be struggling for his life at the accident site and quite likely there may not be any close one by his side or he may not be

able to get even primary aid. You may be completely unaware of this fact and comfortably watching television at home. You may regret this fact lifelong that in spite of being able to afford the best treatment in the world, you could do nothing for him/her. Contrarily, if someone in your family is sick at home, you ensure immediate medical aid. For example, if someone has a heart attack, you would promptly rush him to the nearest cardiac I.C.U. and provide the best of treatment. Even if he does not survive the heart attack, you have the satisfaction of knowing that you did all you could.

Some times it is possible that you are present at the accident site but helpless as there is no quality medical facility within reach or you have to compromise on medical care as trauma care in most places in our country is practically non-existent at present. We may always regret that many a life or limb could not be saved for want of good trauma care or blood transfusion facilities, etc. I am sure each of us has some memories of terrible accidents involving some loved ones or acquaintances that we feel could have still been with us had they received good first aid at the time of accident.

2. Risk to others: A person who drives recklessly not only risks his own life but also that of other commuters on the road. On the other hand, if you do not care about your health or diseases then you are the only one who will suffer. If you are careless about your health it is probably nobody else's business but the moment it starts affecting your driving habits, it certainly becomes everybody's business! A drunken driver or one who disregards traffic rules is like a potential murderer let loose on the roads, causing a serious health hazard!

3. A single mistake that costs you dearly: one single mistake or carelessness may prove to be very risky to your health or may even be fatal. However, this is not so with most other diseases. For example, if you develop poor eating habits or a sedentary lifestyle today, it would take a long time or even years to develop diabetes or hypertension. Even the dreaded diseases like cancer gives us some time. Except road accidents, I don't remember any other mistake, crime or misjudgement in your life where there is provision for such a heavy penalty.

4. Mistake could be instantly fatal: It happens at the time when you least expect it. You may argue that there are many other diseases where a sudden death is also expected like heart attack, brain stroke and the like. The reason is that deaths in these conditions mostly occur in old age when the probability of being behind the wheel is not much. While in road accidents mainly young adults are involved where it is the number one cause for a sudden death.

5. No straightforward solution: Road traffic accidents are a very complex issue and there is no easy way out. The reason is that road accidents are caused by a vast range of direct and indirect factors. Likewise, a solution can be found only by the collective efforts or co-ordination of many departments. At present there is no single body to ensure a proper co-ordinated functioning of these authorities. While in most of the other health problems the management is straightforward, it may be possible that owing to paucity of funds it may not be available to all. However, in case of road accidents, money alone cannot solve the problems that you would probably realise at the end of this discussion.

6. Extreme carelessness among us: Though we are very much concerned or particular about our health in general evidenced by the fact that we take a keen interest in hygiene, diet, fitness and so on, as far as road accidents are concerned, a significant degree of ignorance or reluctance has been noticed among both the people and the authorities. Whenever we come across a tragic accident on roads while driving, we become scared and drive very carefully. BUT alas, only for a short time!

Similarly, seeing some ghastly or gory pictures of accidents in newspapers we do shiver BUT only for few minutes and after some time we get busy in our routine activities thinking it is a part and parcel of life.

[III] CAUSES OR RISK FACTORS OF ROAD ACCIDENTS

If we consider road accidents as a disease then a proper understanding of its causes is extremely essential. Unless we know the reasons properly and clearly, we cannot treat this malady.

(1) Human Errors and Factors

Perhaps you may not believe but it is true that in 80-90% cases human error is directly or indirectly responsible for road accidents. We frequently blame the hardware or the machine we are driving in, but the fact is that it is the software, the driver's brain that is the real culprit behind the majority of such cases. You would be surprised to know that vehicular faults, pedestrian's fault and defective roads are responsible only for 3-4%, 2-3% and 1-2% of total accidents respectively. Human errors can further be divided in to the following categories:

[A] The Speed

Speed is the single most important factor for the road safety. All of us seem to be in a great hurry while driving, but we should also realize that among all human errors, speeding is the most important cause of road accidents. Let us consider how speed affects us while driving.

1. The Risk: When we drive fast, the momentum and the kinetic energy of the vehicle increases. Thus when a collision occurs the impact is much more and can be fatal. For an example, if some one is going to make a suicidal attempt from the first floor [4mt] then there are chances one may not succeed. If the same person makes an attempt from the fourth floor [16mt], there is a fair chance that his wish may be fulfilled. The reason is that in his latter attempt, the velocity near the ground would become double to that of the previous one [64 km/hr against 32 km/hr]. Similarly, on some auspicious occasion while breaking a coconut you must have noticed how easily a very hard coconut turns into pieces when you strike it on the floor with a greater force. Now probably you can understand how dangerous the speed factor could be on roads.

Up to a speed of 30 km/hr, the risk of a crash being fatal is minimal. Once the speed increases, the risk of a fatal crash increases exponentially. For an example, there is three-times risk of a major accident at a speed of 50 km/hr, four times at 65 km/hr and twenty times at 80 km/hr as compared with that of risk at 30 km/hr. The chances of an accident being fatal are nearly 100% if it occurs at the speed of 100 km/hr. In general, an average increase of 1km/hr in speed can cause a 3% increase in the chances of serious injuries. This risk is in relation to the occupants inside vehicles. If we consider the risk of fatal injury caused by the moving car to the pedestrian we find that at a speed of 30 km/hr there is only 10% risk while risk at the speed of 45 km/hr is about 50%.

2. When you drive fast the reaction time available to your brain reduces. You have to take split-second decisions when you face some abnormal situation. Our normal reaction time in such a situation varies from 0.5 seconds to more than 2 seconds. In India with chaotic traffic conditions in the cities, anything can happen on roads like vehicles appearing from all directions, wrongly-parked vehicles, stray animals or road disappearing in to nowhere. If the speed is not very high you can control the vehicle easily and safely in such situations. Two-wheelers lose balance more easily as compared to four-wheelers when brakes are applied all of a sudden.

3. Speed also affects you both physically and mentally. When you drive at a slower speed, your drive is very comfortable. You can talk to your co-passengers or you can enjoy music, etc. In simple words, you just enjoy your driving. On the other hand, when you drive fast you grip on the steering very hard and your body muscles also get taut as you become conscious of driving. Often, you lean forward and you fix your gaze on the road. You have to concentrate more on driving and

you cannot afford distractions. Besides, due to chaotic traffic on ordinary highways you have to use the clutch and brakes more frequently making your thighs stiffer. You develop all the symptoms of fatigue like stiffness of arm and neck muscles, headache, etc. These changes are very tiring and at the end of your drive you feel very exhausted both physically and mentally.

4. A high speed also affects fuel consumption as at a speed above 60km/hr the petrol consumption increases by 30-40%. Though this point is not related with road safety, with the rapidly rising cost of fuel even the people of rich countries are now seriously considering this important.

Why Do We Drive Fast?

1. To Save Time: When you ask someone why he drives fast most of the time his answer is that he is in a hurry. Everybody feels he is the busiest or the most in demand. Yes, it is true that time is a precious commodity or rather time is money. Is it really more precious than our life? On an express highway [that constitutes only around 500-600 km in India] maybe one can save some time without much compromise with safety. But given the condition of our national highways as in most of the cases, it is a futile exercise. For example, if you have to travel 200 km, you may probably save 30 minutes by driving fast but only after an exhausting and risky drive. Consequently, you may not be able to maintain good speed for a long stretch of time. After so much overtaking the time you save is being lost by a very slow moving traffic ahead once you approach a town on the highways as there are no by-passes for most of such towns or owing to jams or check-posts. Suppose, by such exhaustive driving you have saved some 30 valuable minutes, what will you do with these so-called 'valuable 30 minutes'? At the most you can have a cup of tea or relax for a few minutes. Now, honestly you calculate how much time you spend daily sitting idle in front of the television. If you are not a taxi driver then an honest comparison of the hours saved on the highways vis-a-vis time spent for entertainment would confirm that in majority of cases, saving of time is not a genuine reason for speeding [according to Audience Measurement and Analytics Limited which tackles the cable and satellite viewers in India, on any regular day an individual spends two and a half hours watching TV]. These 30 minutes saved could cost you and your loved ones dearly. So don't go by the dictum 'time is money', instead remember 'no life, no money'.

2. Thrill Seeking: Young people, especially adolescents, do crazy things on the road just for the thrill or to prove themselves. It is also a fact that in the age group of 15- 20 years, road accidents are the number one cause of death in India leaving behind even AIDS and

tuberculosis. The desire for driving is unusually very intense. Once an adolescent learns driving, he can hardly wait and driving becomes suddenly the most important thing in his life. Whether he derives any pleasure from reckless driving only he can tell but once an accident occurs, the condition of both the driver and his vehicle certainly become a reason for creating a strange kind of thrill among spectators and passers-by.

[B] Dangerous Overtaking

This is the second-most common human error responsible for accidents. While overtaking, owing to high speed as the accelerator is pressed to its fullest extent, the chances of fatal accidents are much greater. Ponder over the following facts before overtaking:

1. First and foremost, do you really need to overtake the vehicle ahead? You must have observed that on highways most vehicles run in clusters of different speeds. Some drivers choose to drive at a slower speed while others choose a higher speed. So you may find clusters of vehicles running either around 30-40 km/hr or 50-60 km/hr or 80-90 km/hr and so on. If you are moving at 80-85 km/hr, you are fully justified in overtaking a vehicle moving at 30-40 km/hr or 50-60 km/hr. However, it is not wise to overtake a vehicle moving in the same cluster [speed range]. For example, if you are moving at 80-85 km/hr, then you will not gain much in overtaking a vehicle moving at a speed of 85-90 km/hr. Throughout the journey you would find that various vehicles belonging to the same cluster will keep on changing their positions and ultimately everyone will reach the destination more or less at the same time. If you have unnecessarily overtaken such a vehicle then just to maintain your position you have to drive under stress. In such situations I personally feel more comfortable in keeping behind some other vehicle. If you have seen the fleet of cars of a VIP, you must have noticed that the VIP's car enjoys the middle position and it is the pilot car that is the front runner.

2. Time: Assess whether you have ample time to overtake or not. It is the difference between the speed of the two vehicles [yours and the one that you are going to overtake] that will determine how much time it will take to overtake. If the speed of the vehicle ahead is much slower than yours, it would take less time to overtake. On the contrary, if you try to overtake a vehicle that is running with a speed closer to yours, it would take much more time to overtake. It has been found that in a majority of cases the actual time required to overtake a vehicle is just the double of what is estimated by the driver. If another vehicle is coming from the opposite direction, judge whether you would be able to overtake without colliding.

3. The road: do you have a clean, straight visible patch of road without vehicles? Whether the condition of the road is good with no water, mud, sand and potholes, otherwise on applying sudden brakes your vehicle may skid.

4. Pick-up: Before trying to overtake another high speed vehicle, do check the pick-up of your vehicle, especially if it is overloaded. It might land you in trouble in the midst of overtaking. So don't be adventurous with a khatara, a ramshackle vehicle.

5. Is the driver ahead aware of your intention to overtake him? Wait for him to give you a pass. Most of us become impatient if other vehicles do not give us a pass. Some aggressive drivers become desperate and forcibly try to overtake and frequently meet with an accident. Discreet judgment is very necessary.

6. It is very risky when you try to overtake forcefully more than one vehicle in one go. If your attempt at overtaking all the vehicles is unsuccessful, then one of the drivers of vehicles that has been just overtaken, has to create space to accommodate your vehicle in front of him just to save you. Just imagine what would happen if there is a driver who is not the forgiving type and decides to teach you a lesson by not accommodating your vehicle?

[C] Fatigue or Sleep

Fatigue seriously affects our reflexes and is responsible for about 10-15% deaths owing to road accidents in India. Its occurrence in developed countries is even more e.g. UK [20%] and USA [30%]. Some facts that need consideration in this context are:

1. Quite frequently you stay up late preparing for a long journey and get up early. If our sleep is less than 5-6 hours in the preceding night, chances of dozing off behind the wheel are very high [10 times]. If you are a late riser then do not start an early morning drive because your sleep is not complete. So, instead of the wall clock, follow your own body clock.

2. The chances of sleep are the maximum in the late night especially between 2 am to 5 am.

3. The more luxurious the car the more the chances of tending to sleep. In a luxury car running on an express highway, the comfort level is like one's bedroom, so it is no surprise if the driver dozes off. In fact, in a car where everything is powered needing no physical exertion, the only part of your body that moves in this situation are your eyelids. The naughty eyelids may also feel why should they work when other

parts of the body are taking rest? This probably also explains the increased incidence of dozing behind the wheel in the developed countries. Have you seen a pedal cyclist or rickshaw puller sleeping while moving? Similarly, you rarely feel sleepy while driving on the congested city roads or on uneven or pot-holed highways.

4. Avoid starting long journeys on a full stomach because hyperglycemia can make you drowsy and secondly in case you meet with an accident there are chances of aspirating food contents into the wind pipe causing respiratory arrest. Instead of a heavy meal, take small meals at frequent intervals.

5. If you have a driver, always ensure whether he has taken sufficient rest or not. One General Manager of a big company went to some other city and had a hectic day and at night attended a party there. He decided to return at 4 a.m. the next day. The driver was very tired, but he could not dare say no to such a senior person. On the way, he dozed off and met with an accident and both died on the spot. Always have a good rapport with your driver so that he feels free to convey you his problems.

6. Certain medicines tend to induce drowsiness e.g. cough syrup, anti-allergic or antipsychotic drugs. Consult your physician about this when taking any medication.

In case you are tired, avoid driving alone. A co-passenger can help a lot in such situations. He can observe your signs of fatigue or drowsiness, e.g. droopy eyes, yawning and staggering of the car much earlier and can warn you. Secondly, he can drive while you can take some rest. Thirdly, talking to co-passengers when you feel sleepy is a good way to keep sleep away. You can also try listening to music or use chewing gum which can help to keep you alert. Above all, do not make it an issue to continue driving, take a coffee or tea break.

A few car companies have developed an alarm to detect sleepiness in drivers. A camera fitted on the dash board reads the pattern and rate of eye lid movements; passes on the information to an analyzer that gives an audio alarm. It works even when the driver is wearing dark glasses. It is up to us to decide if we need to pay for such a costly technology for our careless attitude.

[D] Drunken Driving

This is a serious problem on the road and a separate chapter has been devoted for discussing it in detail [see chapter 5]

[E] Risk Taking Behaviour

There is a definite correlation between the two facts that whenever the traffic condition is better, there is a temptation among drivers to take a greater risk. It is a frequent finding that when we are more experienced as drivers or when we have better roads or safety features in vehicles, we develop an increased tendency for taking risks on roads. For example, when we have seat belts and air bags in the vehicle we feel better protected against any accident and are tempted to take risk by driving faster. This risky behaviour will nullify any advantages obtained by having seatbelts and airbags. We should not forget that these safety measures only lessen the risk to a certain extent and that too for a certain range of speed and do not eliminate the risk totally. Similarly, if the road condition improves, the drivers also tend to increase the speed that off-set safety benefit of having multiple lanes.

It is true that when one is on a road the probability of meeting with an accident cannot be brought down to zero. Here the point is that we have to weigh the benefits gained against the hazards that we would face by such risky behaviour. In this way, we can optimize the risk or maximize the benefit against the minimal risk. Seasoned drivers who are regulars on the highways have more experience but often tend to be overconfident and take unnecessary risks. What is really important here is that one's confidence level should grow with the same pace as one's experience, otherwise one is surly heading for a disaster!

[F] Distractions During Driving [DDD]

Multitasking behind the wheel could be dangerous. Especially at very high speed a slight distraction can prove fatal. Distracted driving in its various forms contributes to about 9-10% of serious or fatal crashes. For a safe driving, proper coordination of the eyes [should be fixed to the road], hands [should have a good grip on steering] and mind [should quickly react to any unfavourable situation] is extremely necessary. Any act that affects the efficiency of any one of these three factors can prove to be potentially dangerous. Some important distractions are:

1. Use of Cell Phones While Driving: Talking on mobile can delay your reaction time by 0.5-1.5 seconds and the chances of fatal crashes increase four to five times more than normal. Many believe that using a mobile phone while driving has the same or even greater risk as that of being drunk.

You may argue that when you are allowed to talk to your co-passengers or to listen to music while driving then why can't you attend a call. Yes, it is true to some extent. The fact is that most of the driving

you do is at a subconscious level of the brain. The active involvement of brain is required only when some unusual situation arises in front of you. The reaction time of your active brain is so fast that you hardly notice this. So far as listening to music or chatting to your co-passengers is concerned, it does not distract or affect your active brain significantly. Even when you are not listening to music or talking, some thought process is always going on in your brain. However, talking on mobile phone or indulging in 'serious or logical discussion' with the co-passengers certainly causes greater distraction or reduces the reaction time of the brain. When dialing a phone number or engaging in an intense conversation on mobile you cannot watch over the surrounding traffic adequately. Talking with hands-free set also distracts your mind. Though your hands are free, the concentration power of brain is affected as it becomes inattentive during talking. Hands only follow the commands of the brain and if the commander is busy the army will sit idle for any alarming incidence. Newer studies have proved that hands-free set offer no safety advantage over hand-held units. Talking on two wheeler is equally if not more dangerous.

In this situation, it is always better to stop on the roadside and keep the conversation short. You can say that I am driving and I will call you back. Alternatively you can use voice mail to take calls or to leave messages. Some times in emergencies or in extraordinary situations if at all you need to talk on mobile, take following precautions: 1. Use a hands-free device. 2. If you have co-passenger ask him to dial for you. 3. The set should be kept at a place clearly visible to you. 4. Use a familiar set so that you can use it without looking at it. If you or your business are really dependent on calls or cannot avoid them while driving, it is preferable to have a driver. This would also help you to do some additional work besides attending phone calls and the extra earning thus obtained certainly will recover the salary of your driver.

At present the use of mobile phones while driving is punishable under section 184 [rash driving with a fine up to Rs.1000] or under 183 [dangerous driving with a fine up to Rs.1000 and or 6 months imprisonment]. In India using even the hands-free mobile phone is a traffic offence. The mobile phones have come after the MV Act was formed in 1988. As such, a proper amendment is necessary for its inclusion.

2. Setting the Music System: It is frequently observed that the people while driving try to tune in the radio or look for CDs/cassettes in glove compartment that distracts their attention. If you are a 'highly selective type' of music lover then it is always better to keep your favourite pieces ready before driving. If you have a co-passenger then instruct him beforehand. Now a days additional switches are available right on the steering wheel for adjusting the music system.

3. *Children:* They may distract the driver's attention by playing close to the driver or throwing toys or frequently changing their seats from front to back or play with steering or other important levers. Sometimes a ball can move forwards in driver's seat and can be trapped under the brakes. Such behaviour in children should not be encouraged, at least in a moving vehicle. Children should be taught car manners just as we teach them table manners.

4. *Car as a love nest:* Although no data are available, it is not infrequent to find love-making during driving as a cause of severe or even fatal accidents on roads. The moving car has been found a safe, easy, cozy and economic place for dating or love-making. In spite of the fact that you are on road, you enjoy good privacy in car, may be even better than a restaurant. I am not saying that the love birds do it intentionally or in a planned way, sometimes it happens like that. The intensity of these moments can certainly increase the intensity of accidents. Thanks [? really] to the invention of the floor gear in the new cars that has broken the continuity of the front seat thereby keeping the love birds apart.

5. *Dashboard Dining:* With the popularity of fast food, the people are frequently seen eating or drinking during driving. The fast food chains are making changes in their menu and its packaging so that it suits better to drivers. The automobile companies are also helping it by providing modifications like cup holders, bottle holders, and fold down tables or even by providing small refrigerators. I feel this is a wrong trend and has to be discouraged.

6. *Other Distractions:* we often see people lighting a cigarette, repeatedly glancing at their wrist watch, belting themselves or co-passengers, ladies applying make-up or combing hair, etc. A beautiful lady on the road or on the hoarding may also seriously detract your attention. One peculiar distraction typical in India only, is bowing before the gods to pay their respects while passing by the road side temples.

[G] Driving Against One Way

When you drive on a four lane or divided highway, you feel relaxed that at least you would not face a head on collision. It does not hold true for Indian highways or even inside cities. You will be surprised to know that the incidence of head on collisions is more or less the same both on divided and single lane highways [around 20%]. There are a number of byroads leaving or joining the highways and vehicles from these side roads join or leave the highways from whichever direction they please. The most common category that breaks the rules is tractors and unauthorized

jeeps carrying local passengers. In order to save fuel for a very short distance they create a dangerous situation for both themselves and the others.

[H] Erratic parking on Roads

Irresponsibly parked vehicles on roads [trucks, tractors, cars, etc] are the cause of accidents in 20-25% of cases. Although two drivers are at fault here [one who wrongly parked and the second who rams into it] the one who parks his vehicle in the wrong place appears to be more at fault. The chances of crash are higher if there is poor visibility e.g. at night or a foggy weather. Measures would include making vehicles more visible with reflectors and drawing a fluorescent line on the road side to indicate parking slots.

[I] Jumping Signals

Ignoring traffic signals or jumping red lights is responsible for about 9% of fatalities on roads. At night when the crossings are unmanned and the traffic is solely left to the traffic lights, people frequently jump red lights. This might be a cause of fatal accidents when drivers of similar hostile attitude approach the crossing simultaneously with a high speed. Chances of casualties are very high when vehicles approach at right angles. Another situation arises when you are crossing properly on a green signal and suddenly another vehicle after jumping a red signal comes from the wrong direction and collides with you. Sometimes when the green signal is about to finish, a vehicle that is quite far from the crossing, attempts to cross by increasing the speed. In such cases with a high speed near the junction, there are fair chances of it getting hit by another vehicle from a different lane. So always respect the yellow light that is specially meant to avoid such conditions. Nowadays there is an additional timer display to see how much time is left for a particular signal.

[J] Failure to Give Proper Indicator

It is responsible for about 8% of traffic fatalities. Many times you fail to give proper indication to vehicles which are behind you and those coming from the opposite direction or your indication may be too late for the other drivers to react. Remember, the faster the speed of your vehicle, the earlier is the need to give an indicator. For example, if you are moving on an express highway with a fair amount of speed, it is safer to indicate at least two km before. Many times the indicators are not working and you confidently turn or change the lane. It can prove disastrous especially when you turn to the right at a crossing. So check you indicators regularly, they are as important as headlights. Secondly, get friendly with the switches for indicators especially when driving someone

else's car and also confirm on the display that you have given the right indicator. If there is doubt, do not hesitate to use your hand for indicating.

[K] Unauthorized or Informal Public Transport System

A discussion on the causes of road accidents in India would not be complete without mentioning this popular mode of transport. It is popularly believed that the poor condition of the unauthorized vehicles is responsible for accidents on roads, but the fact is that it is the drivers who are to be blamed. That is why it has been included in the section of human errors for accidents.

On the Indian roads a wide variation in the people and vehicles can be seen. On one hand, there is a top industrialist of the country who is contributing a lot to the nation. He believes in traffic rules and road safety, in spite of the fact that he is earning lakhs of rupees per hour and his time is very precious. While on the other hand, there may be an uneducated careless driver of the unauthorized jeep who does not believe in traffic rules without concern for his safety or of passengers in his khatara jeep or for other road users. The only thing he is concerned about is the number of to-and-fro trips that he makes. If he makes one more trip even with rash or fast driving, he saves hundred rupees more. A grand achievement for him! The people are packed like animals inside these vehicles and equal number of persons are hanging, standing or sitting over the top of the vehicles. From the front you cannot guess who the actual driver is. The kind-hearted driver even offers his own seat to the other passengers and shifts more towards the edge. Only one buttock of the driver is lucky enough to be in touch with the seat while most of his body literally hangs outside the jeep. He maneuvers his body like an arch so that both his hands and feet are in contact with the essential items like steering, clutch and brakes. The most uncomfortable is the passenger next [just left] to him who accommodates and suffers the thrusts of the gear between his two thighs. These drivers propel these vehicles like horizontal rockets putting the life of not only occupants in danger but also that of other innocent people or other vehicles on the roads. I feel these jeepwallas will certainly win prizes if allowed to take part in some annual defence or military shows. Often on Indian roads you come across a strange contraption called "jugaad" which is essentially a cart driven by a diesel pump set. These vehicles do not have any proper registration but still we see them running freely on the roads.

The only reason for the presence of these unauthorized vehicles on the roads is that they are cheap and affordable to the poor class and they stop anywhere to pick up or drop people. It is not that the

people travelling inside these vehicle do not believe in safe driving. They do believe and know that these vehicles are death traps, but the choice of vehicle for travelling among poor is often determined by the economical considerations.

[L] Distance between Two Vehicles

Driving too close to the vehicle in front is also an important cause of accidents. What should be the proper gap between the two vehicles depends mainly on the speed of the vehicles. The faster the speed, the wider the gap is required to avert a collision. If you are driving at a speed of 30 km/hr then you should maintain a distance of at least 30ft [10 meters]. Alternatively, the criteria are that you should keep a two seconds gap between you and the vehicle ahead. Here it is assumed that your brakes are in perfect order.

[M] Other Human Factors

1. *Medical Condition:* Defective vision [one should be able to read the number plate from a distance of 60-70 feet], colour blindness, sudden illnesses like heart attack or epilepsy, etc.
2. *Psychological:* mental stress or tension, family dysfunction, impulsiveness, aggressiveness, being double-minded, etc.
3. *Lane Cutting:* Just to grab some space, drivers frequently change lanes.
4. *Age:* more common among the young between 20-40 years
5. *Sex:* In India males are involved in 80-85% cases of accidents. Death amongst the females is low and it occurs mainly as co passengers rather than as driver. Otherwise, the female drivers believe more in safe driving.
6. *Lack of Training:* Untrained drivers or beginners are at more risk.
7. *Under-Utilization of Safety Measures:* Although this is not a cause for accident but not wearing seat belts & helmets certainly increases the severity of the accidents.

Among human error it is possible that you may make more than one type of human errors at a time.

[2] Vehicular Factors

Mechanical defects in vehicles contribute only to 3% of the total number of accidents. These include failure of brakes, steering, burst tyres, etc. A disproportionate rise in the number of vehicles on roads could be related to increased incidence of accidents. It has been seen that many times the drivers after accidents try to pass on their mistake to

failure of the vehicle. Since we rarely go for a proper analysis of the causes in accidents, this cannot be confirmed. Due to this the drivers get leniency in punishments.

[A] The Misguiding Automobile Companies: Car manufacturers behave like race jockeys inciting the drivers to go at faster and faster speeds. While launching any new vehicle, be it a two wheeler or a four wheeler, its pick-up and speed are touted as USP. They claim that its pick-up is such that within 5-6 seconds it can achieve a speed of 60km/hr. An advertisement shows a biker racing with a tiger or a SUV going faster than a helicopter. Some companies even claim to take you into space. Indeed they may do so, but God knows whether you would return or become a twinkling star in space forever! In a TV ad, a group of bikers look more like stunt men in a circus rather than drivers of a vehicle.

Are these manufacturers completely unaware of the conditions of Indian roads or they are just out to misguide the teens? Don't they know that the majority of Indian roads are not suitable for more than 60 km/hr whether it is a two or a four wheeler? Driving with a speed depends more on the condition of infrastructure rather than the digits in the milometer.

[B] Lack of Safety Features: many companies have double standards for developed and developing countries regarding many extra safety features in their vehicles. This is to cut down prices in a competitive market. For example, provision for rear passenger seat belts has been made only in a few expensive models.

[C] Mismatch in Size of Vehicles: This is not a cause of accidents but an important factor determining the severity of impact between two different sized vehicles at the time of collision. Due to the difference in their heights e.g. car colliding with a truck, there are fair chances that the impact would be borne by the windscreen rather than the engine of the car. This would be more so if the car rams into the truck from behind, as the rear bumper of the truck, that lies at a higher level, would directly hit the head of the car driver. Factors that relatively make the vehicle safer are; higher level of driver's seat, heavier vehicle and more mass in front of driver [engine or crumble zone]

[3] Roads and Environmental Factors

Bad roads and weather conditions cause about 2-3% deaths in road accidents.

[A] Poor Road Layout or Conditions: In India except some modern roads, the concept of traffic engineering is totally missing. Some of the road hurdles are:

- Poor or bad road surface
- Blind turns
- Steep or sharp curves on road with no proper elevation of edges
- Sudden narrowing due to bridges and the like
- Single lane highways without median barriers to prevent dangerous overtaking or head-on collision
- Lack of separate pedestrian lanes
- Lack of road signs
- Dangerous intersections

Poor road design or some basic defect in the layout may be responsible for some unusually high incidence of accidents over a particular stretch of road. The local people frequently relate this fact to some kind of jinx, the ghost of a dead driver and a host of other stories. We should identify these well-documented high risk zones on the highways and rectify them.

[B] Speed Breakers: Yes, it is a mild form of punishment for those who do not respond to visual road signs. Speed breaker, if not clearly made visible by paints or sign board well before, can itself prove to be an accident maker. Many a time the ground clearance of smaller vehicles is not kept in mind while making these speed breakers and instead, they break your car and are the cause for many a wear and tear!

[C] Animals, Pedestrians on Highways: Always be aware of your surroundings while driving. Except on express highways, you may frequently find stray animals and pedestrians appearing suddenly on roads and in order to save them there may be an accident. Animals move usually forward, so, if you direct your vehicle behind the cattle, the probability for being right increases. Beware; don't try this if the animal is leggy as you may suddenly find it in your lap, having crashed through the windscreen!

The two most confused creatures on the roads that I have found are humans and squirrels. Their behaviour is uncertain and unpredictable. Humans may move in any direction or may literally turn and twist on the road in sheer panic. So, in case of humans it is always desirable to slow down, so that there is least confusion on the road. It is possible to save a pedestrian suddenly appearing out of nowhere only if the driver gets a minimum time to react. For example, If a person suddenly appears from the front side of a wrongly parked vehicle to cross the road there are greater chances of him getting killed as even the fastest reacting

driver would not be able to stop the vehicle.

[D] Roadside Objects: Like uprooted trees or leaning poles, etc are responsible for a significant number of deaths in accidents. Many times while changing the tyre or repairing the vehicle we put some big stones to cordon off the area, and invariably forget or don't care to remove them from the roads after doing our job. Such a small negligence may take someone's life.

[E] Work on Progress: there is a significant rise in traffic accidents during the major road repairs or conversion of double lane to four lanes, etc, as the conditions become much worse than the existing road. The road may disappear suddenly or there is unequal leveling in the roads or construction material may be lying haphazardly. In spite of separate funds being allotted for barricading or road signals, contractors/road makers hardly see their use.

[F] Day vs. Night Driving: Chances of accidents during the night are eight times higher than in the day. This is mainly due to poor visibility or temporary blindness caused by long-beams of headlights of approaching traffic. Besides this, at night there are greater chances of falling asleep or colliding with a parked vehicle, as roads margins are not clearly visible and a poor perception of distance of other vehicles.

[IV] HIGHWAYS VS CITY ACCIDENTS

About 40% of total deaths occur on the national highways while the rest occur on the state highways, or inside the cities. In the city as well as on highways about 70% deaths fall to the share of pedestrians, cyclists, motorized two wheelers [also called VRU or vulnerable road users]. The reason for a significantly high death rate among this group is that their number on roads is very large and unlike four wheelers, they do not have a metallic cover. The only significant difference in the accident pattern between cities and highways is that while the incidence of city deaths among the car owners is about 5%, on the highways it increases to 15%. This safety factor in a vehicle could be attributed to the fact that in the city due to traffic congestion fatal car accidents are less common. However, driving on two wheelers is equally risky on both cities as well as on highways. Two-wheeler drivers have five times greater risks than the four wheelers and risks increase 10 times if they do not use helmets.

In a majority of accidents the impacting vehicles are the heavy ones responsible for about 82% accidents on highways [truck-65%, bus-17%] and 61% in the city while the car is responsible for about 15% cases.

[V] WHAT CAN BE DONE ABOUT ROAD ACCIDENTS?

[A] Role of Citizens or Commuters

Before discussing the role of citizen I feel, it would be in the fitness of things to clear some misconceptions about road accidents.

Our Misconceptions:

[1] Accidents are the price that we pay for Technological Advancement: Today almost all of us are very much dependent on transportation. One may go so far as to say that accidents are the penalty that we pay for technological advancement. If this is so, then electricity has brought about much more advancement in our lives and probably it is the most widely used invention in all social segments, but the total number of deaths occurring due to electrocution in a year are only 8076 [in 2007] i.e. fourteen times less as compared to road accidents. We have never seen a sensible adult putting a finger into a plug point, but on the roads we frequently observe careless drivers exposing their lives to dangers.

[2] Concerned Authorities are mainly Responsible for it: In a majority of cases this is not so. You have just seen above that in 80-90% cases human errors are directly or indirectly responsible for road accidents. You may be right to some extent as far as accidents inside city are concerned. However, as far as highways are concerned, the total safety lies with us only and how sensibly and carefully we drive. There is no traffic authority but only display signs for various precautions. No traffic policemen but the Almighty punishes you for your mistakes on highways. So blaming the authorities only is not going to solve the problem.

[3] No one can change our Destiny: Some people believe that no one can change their Destiny. It is Destiny that makes or mars our life. They argue that everyone has to die one day and in a manner predestined by God. We also try to convince ourselves that besides accidents so many other dangers are lurking around in our lives. So how long or to what extent we would compromise with these? This is far from being logical and reasonable. It is a lame and irrational excuse to cover up our risk-taking behaviour. It is up to us to mould our Destiny. It is our attitude towards life that largely determines our fate. In brief, we are the architect of fate. There is nothing like divine dispensation.

[4] Accidents are Rare: All of us feel accidents are a rarity as occurring once in thousands and assure ourselves that there is nothing wrong in taking a little risk now and then. But as driving is part of our daily life, there are greater chances that we may meet with an accident

one day. Suppose you make it a habit to drive fast everyday and every month in a year, then according to the law of probability [1 in 1000], within three years you would expect an accident. If you are lucky enough, this accident may be on the thousandth day, or it could be on the very first day you make a mistake. My dear, three years is too short a life. So the above reasoning is fallacious.

[5] Your Vehicle is Strong: You feel safer inside a car having a stronger metallic cover. However, this metal is just an extra protection and does not permit you to take any added risk. Much would depend on the mode or mechanism of the accident. If it is a head-on collision with a similar or smaller vehicle, then probably the strong body may help you. But then, if the other vehicle is heavier, or if it is a side impact or roll over, then even a strong body may not save you. The fact is that the mode or the type of other colliding vehicle to have an accident are not in our hands. It happens like that. It is not a bullfight where a matador can choose the bull of his choice.

[6] Sometimes You Have to Take Risks: A popular notion is that it is okay to take a risk in some situations, e.g. in order to catch a train, in a medical emergency, to reach in time for an exam or interview, etc. But if you stop to think, one missed train is nothing compared to the irreparable loss you're your family will suffer if you are gone. So, heed the dictum, "Jaan hai to jahan hai". Human life is very very precious and not to be squandered away so easily. You have to achieve greater things for yourself, your family, for society and nation so take care of yourself for greater advantages.

[7] This Will Never Happen to You: We believe that accidents happen only to others and we are somehow immune. According to a survey all of us have a risk to an accident once in a lifetime either as a driver, co passenger or pedestrian. I believe most of us must be having some sad memories related to accidents involving near and dear ones.

What to do as Citizens?

We have to develop a culture of respecting human life and also try to minimize the various human errors mentioned above. The challenge of making our roads safer can be met only with the whole hearted-support and commitment of the entire community. Eighty to 90% accidents occur due to human errors. If we are able to bring about a change in the software i.e. driver's attitudes, we would automatically be able to reduce accidents to a large extent.

The solution 'in theory' appears to be very simple, i.e. follow safety rules' but we hardly see any actual results on the roads. All of us understand about road safety very well, we talk seriously about it, we suggest it to others, we often make a lot of hue and cry over accidents. BUT the fact is that we ourselves don't follow rules. What should we call ourselves, a bunch of hypocrites?

A theory of motivation vs compulsion may probably explain this phenomenon. To follow traffic rules requires both a strong motivation as well as some kind of compulsion. This would be clear with one example of how these words motivation and compulsion are important for us on roads. For many health problems like obesity, the solution appears to be very simple i.e. 'if you eat less and do some exercise' you can easily get a desired figure or weight. Is it really that simple? Had this been so simple then there would not be mushrooming of various health clubs or fitness centers in our country! Instead, it really requires a strong motivation. Many of such people develop a strong will from inside and seriously become conscious about their health and are able to achieve their targets. Still there are some people in whom even a strong motivation fails to convince them and stimulate them to take an initiative. But once they are diagnosed some complications of obesity like hypertension, diabetes, etc, only then they realize seriously about the gravity of the problems. Then they start taking necessary measures like calorie intake, exercise, etc. This is called compulsion. Similarly, at present only a small percentage of people really understands and follows the safety norms seriously. Yes, we can certainly increase their numbers by strongly motivating them. Do not think that only a few people cannot change the system if others don't follow the same. For this noble cause, even if you are single, do not hesitate and be sure that thousands would join you. Interestingly, there would still be a large number of the people who would not care to respond to it. This group would require some kind of compulsion. This compulsion could be in the form when they suffer a humiliation of punishment or a narrow escape in some accidents.

Please honestly watch and control your wrong decisions while driving, otherwise very soon dicey driving may become a habit. If you don't control your rash driving habit it may become a part of your character and one day it may shape your destiny, leading to a sad end.

[B] Role of Good Parenting

1. Parents should be a role model for their children as they observe and imitate all our good and bad habits and behaviour. It would be quite

impractical to ask the children to drive in a way that you tell them and not in a way how you drive.

2. A Formal Training: Learning driving should not be taken lightly. A formal training is very helpful as after learning the basics and practical training one's driving becomes smoother, more confident and safer. Driving courses focus on specific driving skills and knowledge, but they're not a substitute for maturity and experience.

3. Keep an eye on their driving habits: Never praise children for crazy driving habits. During the initial period always supervise their driving in different traffic conditions, roads and weather both in the cities and on highways. Do not yield to remarks like, 'papa you never trust my driving' or 'you always consider me a small kid' or 'you never allow me to have fun' etc. This kind of indulgence is fraught with dangers.

4. Don't yield under pressure: children try to pressurize parents to let them drive when they are underage or get them a new two or four wheeler, by saying that all of their friends have one or now even the neighbor's kids and cousins of a younger age are driving. Many times parents buy them a vehicle just like a toy due to their persuasion or their own pampering. Had it been only a toy this would be just passed off as waste of money. But this could prove to be a fatal toy for the child who is riding and for some innocent persons on the road. Many times I have observed small kids sitting on the parents' lap and driving a car, or a small child sitting independently on driver's seat with help of some extra cushions to raise the level of seat. Parents are mainly to blame.

5. Don't go for fake Driving Licenses: Many times the parents themselves are responsible for encouraging their children to drive before the legal age. They get them licences by furnishing fake certificates with the justification that it will help in schooling or tuitions. There are some valid reasons for making an age limit for driving. For driving a vehicle both physical and mental maturity is essential. It is not like that; if an extraordinary child of 6th standard qualifies an exam of 12th standard, justifies reducing the age limit for appearing for 12th class. If minors are caught with such fake licences, they may be penalized under two sections: 1. the minor is booked for driving without a licence which carries a fine of Rs 1000 with or without the vehicle being impounded. 2. The owner of the vehicle may also be booked for letting an unauthorized person [in this case a minor] drive his/her vehicle. This calls for a fine of Rs 1500 and/or imprisonment.

[E] Role of Media

Present Status: Probably it has been assumed that road traffic related problems and accidents are a local problem/issue. Most of the

news about the road traffic accidents usually finds its place in the local news papers. So far as the print media is concerned, it has been found that it is doing its job effectively by covering them adequately. Not only about accidents, is it also trying its best to bring other traffic related issues into the notice of the public. It frequently shows pictures of open manholes, potholed roads, leaning pole, traffic jams, water logging, etc. to exert pressure over local authorities. It exposes corruption involved in road building etc. Not only in local news papers, in the national dailies also you may have noticed that in recent times there is a significant rise in the number of editorials or traffic related articles expressing their serious concern over deteriorating traffic conditions, pollution, violence on roads, etc.

However, as far as electronic media is concerned, even the major road accidents do not find place in most of the news channels of the national level. They report such cases only when they occur in national capital or occur to some VIP, or the accident occur in some unusual way, so that they can show some good footage or visuals to 'entertain' the viewers. To them it is the visuals not the contents of the news that are important. Unless a good footage of accidents is available, even the major accident news would not find coverage more than the running strips down below on the TV screen. Yes, there are news channel that are showing a good concern about the traffic related problems, but unfortunately, their number is really very few.

Many times it has been seen both in print as well as in electronic media that casualties due to some other trauma or violence get much greater attention than road accidents. In India deaths occurring in murders and train accidents are only one third and one fourth respectively to that of road accidents. But it gets much larger coverage. The best example for the disproportionate coverage is the news on deaths due to terrorist activities. The data of 2007 shows that the deaths due to road accidents were approximately 150 TIMES more than terrorist related casualties, but any deaths in terrorist attacks is a 'news material' for a full-day coverage and that too for many days. Yes, I agree it is required to build up pressure on the government to take action against terrorism. On the other hand, I would not be wrong if I say; by giving such a disproportionately huge attention to the news on terrorism indirectly helps the terrorists to achieve their main aim i.e. arresting national and international attention. Such widespread news always affects the country's economy adversely.

To a great extent we, the citizens, are also responsible for the present way of tackling the news on road traffic accidents by the media, because we are actually the one who decide or affect the TRP of any

such news. In newspapers almost every day we find that there are more deaths in road accidents as compared to the murders in cities. We go quickly through the news on the road accidents in the newspaper, but take a great interest in the murder mysteries of our city. Similarly, on TV also, in spite of the full day coverage of the crime news, an extra half to one hour is totally apportioned to the night as a crime reports. The reason is simple, we like it and the media cashes in on our frailty and passivity.

Expectation from Media: The media, especially the electronic, should realize that it can play a great role in tackling traffic related problems. Media can not only influence the general public but also the government. The government gives due importance and responds accordingly to every news items highlighted by the media. By giving responsible and objective reporting, the media can increase community awareness and understanding about different aspects of road safety, such as causes of accidents, public attitude, role of authorities, etc. Support of media is critical for the success of all government or nongovernmental organizations [NGOs] towards road safety initiatives.

Like health and fitness programmes, daily or weekly brief programmes based on traffic related problems can be of great help to change the attitude of the public. News should not be confined as a bulletin of score related with number of deaths in accidents, instead it should include from time to time some active group discussions that should include the point of view of representatives who are concerned with road safety, e.g. the public, government authorities, automobile companies, etc.

Radio is still a very popular mode of entertainment and news covering 27% of the Indian population. This can be used for similar purposes. Recently FM radio is again getting very popular among city population. A person while driving a vehicle is more susceptible to suggestions regarding the road safety. So FM radio can play an important role enlightening the public regarding traffic safety.

[B] Role of Vehicle Safety Features

[1] Seat Belts: At present safety belts are the most effective and economic means of saving lives and reducing serious injuries in traffic accidents. It protects the occupants from any injury due to forward movement or ejection in case of sudden deceleration. It is mainly effective in a frontal impact and in roll over cases. It can save us from a fatal crash to the extent of 40-65%. Thus you can estimate how many lives are saved or can be saved in a year by using it. Seat belts are also necessary

for rear seat passengers otherwise their bodies will hit the front seat and cause serious injuries to front passengers. There are many examples where the front passengers survived the accident but the rear seat passengers died due to absence of seat-belts. A few misconceptions exist that the belt may trap a passenger, and it is not suitable during pregnancy. In this regards the only precaution that is to be taken is that the lower lap belt should lie low across the pelvic bone instead of directly on the abdomen and the passenger should sit in an upright position. Sometimes it can cause minor bruises which is nothing compared to it's role as a life saver. Many drivers are reluctant to use the belt and if asked they give various funny excuses like: 1. It is required only on highways. 2. It makes the person feel as if tied to the car seats. 3. One was driving in a slow traffic, so one felt there is little probability of accidents. 3. It can crush one's clothes. 4. One was in a hurry, etc.

For enforcing the use of seat belts besides laws, there are seatbelt reminders. It could be a visual-blinker on the front panel that most of the time people ignore. Alternatively there is an alarm which sounds till the belt is put on. There are some stubborn people who put off the alarm by locking the belt not in front but behind their bodies or sit over it after locking. God knows whether they are trying to fool the sensor of alarm or themselves! So, in India probably a system that will not allow the car to start till belt is put on would probably work better. In most countries rigid enforcement of laws has been found to be the only effective way to get motorists to use seatbelts.

[2] Helmets: For motorized two wheelers this is the single most successful and cost effective protection during road accidents. It can reduce mortality in severe accidents by about 40% and the risk of severe head injury by about 70%. Remember head injuries are responsible for 75% of deaths among motorized two wheelers. Among the total neurotrauma admissions, head injury sustained in road accidents constitutes about 60%. Even if you survive with head injuries; there may be significant neurological deficit that may cause a miserable life for both you and your family. So never underestimate the role of the helmet while driving.

Some of the common excuses that you may come across for not using helmet are: 1. It spoils the hairstyle. I have seen an ad in which a hair cream is claimed to maintain the straight hair even under the helmet. This is a perfect example of how these companies closely observe and encash the anxieties of the youth. 2. In summer, it causes a lot of sweating. 3. It is cumbersome to carry or prevent getting stolen.

4. Some smart boys might not want to deprive the girls of seeing a dude like him.

Usually helmets come in dark colours, but I feel a light color would be more visible during night time. Alternatively, fluorescent colours may be used to increase visibility. As with the case of seat belts, compulsory helmets laws work and reduce injuries and fatalities on two wheelers all over the world.

Tip to wives: While celebrating some happy events [like birth days, karwa chauth, marriage anniversary, etc] instead of gifts or jewellery, wives should ask for commitment from their husband, regarding the use of seat belts, helmet or for speed limits.

[3] Airbags: This is an additional protective device for car drivers and front passengers. Its effectiveness, if used alone, is only around 20-25%, but increases to 65-70% if used along with seatbelt. One should be clear that airbags are never an alternative to seatbelts but an extra-safety feature. It is also important to note that wearing seat belts is mandatory even if there are airbags for the following reasons: (1) Seatbelts keep passengers in a correct position, so that air bags fit properly between the steering and the body. Otherwise, airbags may seriously injure the drivers. (2) A sudden pull on seatbelt activates a pretensioner system that further tightens the belt so that it grips the body of driver snugly in the event of an accident. The mechanism of action is that it has a sensor in front of the vehicle that gets activated when a severe impact or deceleration is there. This sensor triggers the inflator or chemical propellant that inflates quickly the bag with nitrogen or argon gas. The whole process occurs quickly [in 1/20th second], we hardly notice it. Many carmakers are providing additional air bags [up to 10-12] in the door frames, floor and roof in some costly models.

Despite being a very costly safety device, the bags have several other disadvantages as compared to seat belts viz: 1. Airbags work only in severe impacts while seatbelts protect even at slower speeds. 2. Airbags work ONLY in frontal crashes while seatbelts are effective during side impacts and rollovers too. 3. Protection rate of airbags is very low. 4. They are designed only for adults and older children and can cause serious injuries to small children. The only advantage of air bags is that they protect the upper body better during high-speed crashes when the seatbelt may not effectively restrain the head and the chest.

[4] No to Metallic Bars or Stiff Bumpers: The heavy steel bumpers [also called bull bars] were designed mainly for SUVs in rural areas for

protection of vehicles from large animals, etc. Many people prefer to use stiff metallic bumpers in their vehicles much like armour. Yes, this does provide safety BUT only to the vehicle and not to the driver. Vehicles are designed in a way that the front portion crumbles after a collision, and dampens the impact of the crash before it reaches the driver. Had there been metallic bumpers joined to the main axis of the vehicle, the majority of the impact would have been passed on to the driver causing more serious injuries. It is the same difference as a person falling from a height onto a cemented floor or on sand. For the same reason now instead of metallic bumpers [that used to be popular in old cars] all the new cars have nonmetallic bumpers. So would thou save your beloved car or thyself?

[5] Periodic Check for Vehicle: If your vehicle is singly handled, you can very well make out if there is any thing abnormal during driving. Ignoring the fitness of your vehicle may tax you heavily. For example, if you ignore a smooth tyre, poor brakes, any abnormal sounds or oil dribbling from the engine, it could be a cause for an accident. Though prima facie in such cases it would appear to be a defect in the machine, but truly speaking, it is the fault of the driver who maintains the machine. Commercial vehicle owners have been found to be more negligent about the maintenance of their vehicles. Please know your vehicle fully by going through the manual lying in glove compartment of your vehicle. I believe that hardly gets your attention beyond using its three free service coupons.

[6] Restriction on Engine Power or Forcing less Powerful Vehicles: In some countries e.g. Japan, inexperienced drivers or traffic offenders are transferred to vehicles that have less power [especially bikers]. This has shown a reduction of casualties by 25% in young motorcyclists.

[7] For Non-Motorized Vehicles: Bicycles and rickshaws should use both front and rear reflectors and fluorescent colours to enhance their visibility at night. These reflectors should also be mandatory for cattle carts. Use of helmets by cyclists also reduce the probability of injuries and fatalities.

[C] Role of Government

Present Attitude of the Government:

Although the government is very well informed about the present road safety and about urgency or priority for serious measures for it, we do not see a desired response from the government. The government is very active in making some committees for the detailed study on such traffic problems. Yes, it is true that these committee members do very

hard work to prepare the feed back or guidelines for betterment regarding road accidents and other traffic related problems. It appears that these guidelines are basically recommendatory, or just a suggestion and not mandatory for the government to follow. So nobody can guess when the actual work would start after these recommendations. Sometimes the proposal is so extensively and slowly churned through committees and sub-committees on planning, finance, law, etc, causing a considerable delay in implementation. By that time the scene or requirement changes completely and the purpose is defeated. Ultimately, it is the common man who has to suffer at the end and on the 'road'. To whom the common man should blame for the avoidable sufferings?

Expectations from the Government:

Measures to improve traffic system require a strong political will and financial investments, so the decisions need to be made at the highest levels of Government. Practically speaking, there are some measures that can be implemented properly only at the level of the government and for that the public cannot be held responsible. These are:

[1] Need for a Single Leading Agency: In many countries, good results had been obtained when they formed a single body or agency at a national level to deal with different kinds of issues regarding the road traffic safety. In India, if we make one such lead agency responsible for all kinds of traffic problems with adequate resources and powers that would help a lot in this regard. This agency will help in coordinating among the various departments related with traffic safety. It can mobilize political support on priority basis and resolve many other political issues like Central vs State governments. Moreover it would minimize the blame game among the various departments and it can also be made publicly accountable. A similar kind of single body would also be helpful for the city and urban traffic. Although a proposal for such single agency both for highways and city is probably under consideration for the last many years, but nobody knows when it would come into existence.

[2] Road Traffic Safety: As a Subject in Education System: The topic of 'road traffic' covers various technical or engineering issues. It affects the people of the whole country irrespective of age group, social status or the city. Thus it deserves to be included as subject in our education system. Education of the traffic science is like a vaccine against the epidemic called road accidents. Our mental-make up is such that unless we introduce a subject into the educational syllabus, we do not recognize its importance in actuality. Traffic science, in spite of being a century old, has still not found a place in our education system, especially

at college level. Now it is better to be late than never. It is the job of experts in the education system to decide how to spread this traffic education into different classes ranging from primary to university levels. Some suggestions are given below:

1. In Preschool: Nursery children may be introduced to the elementary concept of road safety through small stories or rhymes. Don't think it is too early to educate small kids. It is a fact that one never forgets the rhymes or stories learnt in the nursery classes. When a three-year-old child can drive a car expertly in his computer games, why can't he understand traffic rules? We should not teach them all traffic rules at this stage, but we can certainly make a start.

2. In Primary School: School curriculum should include a section on road safety. Children may also be taught how to walk on and cross roads by giving examples.

3. In Middle and High School: By this age they start riding bicycles or small motorized two wheelers. Now traffic rules and the road signs can be taught in greater detail. Principles of accident prevention, basic life support and First-aid can be incorporated in the school curriculum at higher secondary level.

4. In Universities: Traffic Science has still not been evolved as a subject for study at the university level. I think it deserves to be a fully-fledged subject in engineering. I am sure if this subject is introduced at a higher level, certainly those who pursue it as fulltime career will get priority over inexperienced people in this field. A rapid rise in the turn-over that is involved in the road infrastructure and automobiles, raises fair hopes for those who follow it as a career.

[3] Better Road Infrastructure: Here I would consider highways only. The urban roads have been discussed in chapter 10 [Biography of Urban Roads in India].

Highways are the most common route of transportation in India today and for this we totally depend on the government. They bear almost 80-90% of the country's passenger traffic and 60- 65% of its freight. Proper roads are not only important for safety reasons but also for comfortable driving and long life of vehicles. Although the total road network in India is very vast [33,15,231 Km] being next to the USA, the quality of roads is not satisfactory on most of the highways. The reason is that it gets only one-third of the required funds for its maintenance. This leads to the deterioration of roads and high transport costs for users.

The National Highways Development Project is an excellent effort

on the part of the government for the upgrading and maintenance of national highways. Giving priority to constructions of national highways seems to be very cost effective as investing on 2% of road network would benefit 40% load of total traffic in India.[NH constitute 2% of road network but carry 40% load of total Indian traffic]. Having a separate authority for this purpose will further facilitate its timely completion, maintenance, and proper use of the latest technology and safety measures for the designing and construction. Though we don't expect the government to construct express highways every where but four lanes are a dire need to lessen the burden of traffic on our roads. Whenever we drive on one of the newly-constructed expressways, it is a pleasure and a sea change from the crowded city roads. This is one of the few reasons for which the government deserves sincere thanks.

However, there are to be some concerns about the speed of road construction under this project. Up to the end of 2008, out of total target of 52,755 km highways, in only 18% the actual work has been completed. Considering this speed it will take several decades for all NH to be converted into world class highways and that too if it is on the priority list of every succeeding government. This above fact is for only 2% of Indian roads. There are State highways [4%] and district roads [14%] that also carry a significant percentage of road traffic [40% of total Indian traffic], we don't know what to expect for them. If a project is not completed in time, there are several disadvantages: 1. Traffic demands keeps on changing with the passage of time, so the scene may become quite different when the project is completed, and it may not serve the purpose. 2. There is a significant rise in traffic accidents during the period when the road is being made as the conditions become even worse during those days. 3. The cost of the project rises tremendously.

There are also some minor but important issues regarding these highways policy that I would like to mention here.

1. Highways should be made with a long-term planning so that further widening may not be required soon. This would not only save nation's resources BUT also trees that are sacrificed in the wake of road making.

2. Except a few express highways, in all the newly-constructed four lane highways, lack of facilities or convenience centers facilities is a serious problem especially for women. On Indian highways, it seems, this facility is supposed to be provided by petrol pumps owners only but they are poorly maintained and usually locked up. In fact, availability of toilets becomes a USP of road-side dhabas where its availability gets

priority over the menu.

3. National highways project should truly be considered like one of our national programmes in getting the priority for the budget, etc irrespective of the fact which government is in power. Besides, these projects should be minimally interfered with by the other ministries. Changing its chairmen frequently may also affect the progress of the project. For highways we need a chairman with sufficient power and budget.

4. Remember even on the best roads in India i.e. expressways, incidence of accidents is significant. For example, on the Mumbai-Pune expressway every week on an average five people are killed in accidents. Thus again the importance of human errors cannot be overemphasized. Though this high incidence of fatal accidents is not seen on the express highways of the other countries, having even much higher maximum speed limit i.e. between 120-140 km/hr [USA, UK, china and France]. We should examine as to why this is so in India where the maximum speed that is allowed on all kinds of highways including the express one is only around 80-90 km/hr [varying among the States].

5. Toll tax: It is true that tax is necessary for the maintenance of the highways. While deciding its amount the government should see to it that toll tax is kept to the bare minimum. The government should consider: [1] only the maintenance cost should be the target of toll tax and the construction cost should not be taken into account. [2] All this money is actually used for the maintenance of highways. The government should ensure whether jobs the company is supposed to provide, are being done or not. [3] A neutral team should audit the accounts of the companies whether its expenses are genuine or cooked-up and inflated.

6. Many times the curves in the roads are not straightened. As a result, one is not comfortable in driving even when the road size is adequate. Perhaps the authorities try to avoid any conflict with the local land owners regarding the land acquisition as it may cause delay in the project. Although as per suggestion, curves are necessary because as it forces the driver to remain at the lower speed limit. However, I don't think this could be the reason for these left-over curves.

[4] Better Mass Transit Systems: The public transport system is an extremely important measure against road accidents not only inside cities but also on highways. I believe this sector really needs greater attention as it would help the real major victims i.e. vulnerable road users who constitutes 68% of total deaths. The role of public transport system for both highways and inside cities has been discussed simultaneously

in detail in chapter 12 [How to Decongest Cities part I: Measures for vehicular factors]

[5] Better Traffic Control: Measures against Speeding: Considering speed as the single most important determinant for accidents, it should be the core theme for the road safety measures on highways as well as in cities. For this, authorities can take the help of: [1] Video cameras: they are considered the most cost effective means. On busy roads it has been found that within six months their cost is recovered. Besides, it records photographic evidence of a speeding offence that is admissible in a court. [2] Speed governor [also called tachometers]: these devices can be fitted to vehicles to limit maximum speed of vehicle. They are useful in heavy goods carriers and public coaches. [3] Intelligent speed adaptation: In this system the vehicle knows the permitted or recommended maximum speed for the road along which it is travelling. To control the speed, a digital road map coded in the vehicle works in co ordination with a satellite positioning system. [4] Use of Radar

If we simply display the sign that 'Speed limit for heavy/light vehicle is 50/30 km/hr, we may not get the desired results but once we add to it a punitive measure like 'fine of Rs 1000 for crossing the speed limit and random checks ahead' a much better response could be obtained.

Measure to Control Drinking and Driving: see the chapter on drinking and driving [chapter 5].

Highway Patrolling: Highway police have a great role to play in helping accident victims. It can also help by properly enforcing safety regulations. The two most important traffic violations are those for erratic parking and driving in wrong [reverse] lane. Besides, they can keep a check over speeding and dangerous overtaking. The fear of being caught can help traffic move in order. A similar kind of patrolling can also help to control rash drivers in cities between traffic lights.

Compulsory Reporting: In many Gulf Countries, reporting an accident to the nearest police station is compulsory. You cannot settle the issue at your level, instead you have to face an enquiry. You cannot even get your vehicle repaired without informing the police. The garage owner will be punished if he removes the dents or paints the vehicle. In Saudi Arabia, after the accident, both the drivers [if not hospitalized] are taken to a police station irrespective of the fact whose fault it was and are kept in jail till the responsibility is fixed or compensations are paid. In India probably this would be too much, but at least the reporting of accidents should be made compulsory even if there is no serious injury. This would be not only a deterrent but also help to analyze the accident data. It is an irony that any rule in India made for a good cause very soon becomes

a ground for corruption.

[6] Better Trauma care system: see chapter 14 [how to help accidents victims]

[7] Control over corruption: Last but not the least a strong will to curb corruption in all segments is necessary, so that major part of grants is utilized for road safety [see also chapters 7&13].

[F] Others' Role

Role of Human Rights Commission: "safety on the road" is a fundamental right of citizens and an essential condition for safe and secure living and a sustainable development of society. In this era of fast moving vehicles, the weaker sections on roads like pedestrians are losing their rights of safety on roads.

Celebrities: Celebrities and entertainment industry should not glamorize speed and should endorse wearing seatbelts and helmets. There is need for more 'traffic theme based' movies. Films should avoid stunts showing speed because that makes the viewers prone to imitate.

Advertisers: Discourage advertisements which glamorize and promote unsafe practices and products.

Survivors of road traffic crashes and family members of the sufferer should form an association and try to spread awareness about safe driving, etc.

Role of social organizations NGOs and business leaders: There is a need for an aggressive programme for the road traffic accidents at the national level where all these can contribute considerably.

Research: New car models are to be subjected to a range of crash tests and also to pedestrian friendliness, especially in Indian conditions.

[VI] SOME GOOD AND BAD THINGS ABOUT TRUCK DRIVERS

Yes it is true that truck is frequently found to be one of the impacting vehicles in roadside accidents. I have tried to explore some of the relevant points regarding this high incidence of accidents:

1. At present trucks constitute about 4% of the total vehicles [22 lakhs belong to the big and 11 lakhs to the small category]. Though apparently their number is much less as compared to other vehicles, considering the fact that they are always on the run as compared to personal vehicles and they run mainly on highways, there are greater chance that big and impacting vehicle is a truck.

2. Yes, their thinking may be different, as they are more concerned with safety of goods inside rather than the safety of public on roads.

3. Most of the trucks are overloaded and proper balance of such vehicle poses a real problem. Thus their drivers avoid taking a swift or acute turn suddenly if they are supposed to do to save someone. For the same reason they do not prefer to take the truck off road in such situations.

4. Since truck drivers have less chances of being hurt in case of a collision, they have fewer inhibitions in such situations.

5. Only in 25% cases the truck owner himself drives or accompanies the driver. So unlike drivers of the personal vehicles, in 75% cases there is no one with truck drivers to check their driving habits, especially if there is an element of aggressive behaviour or rage on their part.

6. They frequently drink while driving. Surveys reveal that more than 75% drivers consume alcohol during driving.

7. Sometimes to dodge the traffic police or RTO personnel [who frequently indulge in illegal extortion of money], they drive rashly at a high speed.

8. They are over-worked. For making more profit, transporters frequently force their drivers to work for long hours even when they are exhausted.

9. It has been found that more than 60% drivers have fake driving licences. They are not properly trained and their knowledge regarding traffic rules is very poor.

So far as road manners on highways are concerned, I have personally found truck drivers better than the car drivers. It is quite possible that when you ask a car driver for a pass, just out of ego he may not allow you for quite some time. If somehow you push in without waiting for a pass, you probably may not find any genuine reason why it did not allow you to overtake. This is not usually so with truck drivers. Whenever possible, they immediately allow you to overtake. They will also indicate nicely by throwing their hand signals. While car drivers hardly give even the indicators, let alone giving hand signals. Many a time you become impatient if not given a pass by truck drivers and you forcibly overtake it and invariably you would find a genuine reason why they were not allowing overtaking and you regret your decision. Moreover, till you get the pass, they keep you busy in reading some very interesting or funny rhymes based on humour and philosophy.

These truck drivers cover their journey in terms of days or weeks as their trip requires freight to be transported to long distances. This along with the fact that speed might affect the balance of the loaded trucks, they are hardly ever in hurry on roads. While, we the drivers

of cars, two wheelers and even buses cover their journey in terms of hours or minutes. We are the ones who drive mostly in a hurry or desperately.

Some suggestions:

While sharing the road with trucks, buses and other large vehicles, besides the above mentioned points, following suggestions can help us in safe driving.

1. Most trucks need a longer distance to stop. So if there is a truck behind you, signal your intentions well before turning, slowing or stopping, so that truck drivers behind you get more time to apply the brakes. When stopped, especially going uphill, a truck may roll back farther than a car when the driver releases the brakes and engages the clutch. Leave at least one car length between your vehicle and the truck ahead.

2. Be visible to truck drivers. Truck drivers rely mainly on their mirrors and there are some blind spots like on both the sides and immediately behind the truck where the truck driver cannot see you. Stay slightly to the right of your lane, so that you can be seen in the truck driver's mirror. Never follow so closely that a truck driver cannot see your vehicle in the mirror. If you can't see the driver in the mirror, the truck driver also cannot see you.

3. Manufacturing companies should be asked to use a metallic sheet around the trucks covering the lower open area. These are also called under-run guards that prevent vehicles of smaller height from running under the truck.

4. According to their driving reports, they should be rewarded or punished by their employers. Out of these two, the punishment has not been found very effective instead a reward or incentive for not having crashed has been found to be more useful.

5. The transport industry should realize that drivers need adequate rest and breaks while driving.

6. They are very much underpaid. The latest surveys have shown that in 80% the monthly salary is between Rs 1500-2000 while in 15% it is between Rs 1000-1500. More than 90% are not given any benefit of PF, GF, pension or other necessary facilities. The transport industry should consider their problems seriously.

7. Improve Educational status: The educational status in truck drivers is very low especially in English. Though the national literacy rate is 65.4%, it has been found that only 40-50% among general public can

read and that too in their regional language. Commercial drivers carrying freight have to move more frequently to different States in India, having their own regional languages. The fact that we are using either English or one of the regional languages for sign boards makes it difficult for truck drivers to understand road signs. One uneducated truck driver argued with me, if in India an uneducated or angootha chhap [thumb impression] person can be allowed to contest an election to run the whole country then why can't he run even a vehicle. I answered him that I cannot comment on the politics but driving a vehicle is certainly a very important and responsible job!