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CONCEPTUAL UNDERSTANDING OF THE ROLE OF HUMAN RESOURCE DEVELOPMENT IN ROAD SAFETY**RICHARD VINCENT D'SOUZA****RESEARCH SCHOLAR****CANARA BANK SCHOOL OF MANAGEMENT STUDIES****BANGALORE UNIVERSITY****BANGALORE****K JANARDHANAM****PROFESSOR****CANARA BANK SCHOOL OF MANAGEMENT STUDIES, BANGALORE UNIVERSITY****BANGALORE****ABSTRACT**

Human resource development (HRD) involves improving the knowledge, skills and attitude of people for personal growth and excellence. Using the same analogy of HRD, it can be applied to safety management on the roads. People can be taught the knowledge, skills and attitude required for the safe use of roads. It is very important because the analysis of the various causes of road accidents clearly demonstrates the preponderant role played by the human factor. This aspect thus constitutes a fundamental component of danger on the roads and has become even more important in relative terms due to the significant progress achieved in recent years in the other relevant spheres of action which are traditionally, the improvement of the road network and of the designing safe vehicles. Road users include, pedestrians, luggage carriers, horse riders, bullock carts as well as those who ride bicycles, tricycles, motorized two wheelers, cars, vans, trucks, tractors, and buses.

KEYWORDS

Driving skills, Road user, Safe driving, Human errors.

INTRODUCTION

People are fundamentally mobile by nature. In the Stone Age they moved from place to place walking bare foot. In the Agrarian Age they domesticated animals like camel, horse, cow and donkey to use them as means of transportation. Road transportation is by far the commonest means of transportation compared to others like air, rail and water. Most often people use roads as the means to reach the destination. Therefore safety on the road is of paramount importance for the wellbeing of individual and the society. People often believe that driving skills and knowledge about driving are all that is needed for them to be safe on the roads. However, one of the most important influences on driving ability is their attitude towards driving and the resultant behaviour on the road. Even if we are driving rightly the mistake of other road users can engage us into a road crash. The adverse consequences of road crashes are tragic both in terms of death and injury to road users and damage to economic assets. Road crashes are manmade and preventable. Training road users for the knowledge, skills and attitude required for safety can go a long way in promoting accident free roads.

The first road traffic accident death was reported on 17th August 1896 at London (Andrews, 2010). Bridget Driscoll was a 44-year old mother with two children who had come to London with her teenage daughter and a friend to watch a dancing display. The crash occurred on a terrace in the grounds of Crystal Palace in London, and while the driver was reported to be doing four miles per hour, witnesses described her as being hit by a car travelling at tremendous speed. She died minutes later of head injuries. The car was owned by the Anglo-French Motor Car Company Roger-Benz who were offering demonstration rides to the public. At the time of the crash, the car was being driven by Arthur Edsell, an employee of the company. He had been driving for only three weeks and no driving tests or licenses existed at that time. He had apparently tampered with the belt, causing the car to go at twice the intended speed and was also said to have been talking to the young lady passenger beside him. After a six-hour inquest, the jury returned a verdict of Accidental Death. No prosecution was proposed or brought against the driver or the company. At the inquest into this death, the coroner was reported to have said "this must never happen again".

More than a century later, 1.2 million people are killed on roads every year and up to 50 million more are injured. Road accident is most unwanted thing to happen to a road user, though they happen quite often. Attitudes towards the road environment and driving can impact the driving behaviour. Unfortunately, an increasing number of road traffic incidents are being caused by aggressive drivers. But most of the drivers don't learn from their mistakes on road. Generally road users are aware of the general rules and safety measures while using roads but it is only the laxity on their part which cause accidents and crashes. Hence the main cause of accidents and crashes is the human error.

Throughout the world, roads are bustling with cars, buses, trucks, motorcycles, mopeds and other types of vehicles for the transportation of goods and people. By making the transportation of goods and people faster and more efficient, these vehicles support economic and social development of the society. While motorized travel provides many benefits, it can also cause serious harm unless safety is made a priority. Pedestrians and cyclists using roads are particularly at risk. If current trends continue, the number of people killed and injured on the world's roads will rise by more than 60% between 2000 and 2020. Most of these injuries will occur in developing countries where more and more people are using motorized transport. In these countries, cyclists, motorcyclists, users of public transport, and pedestrians are especially vulnerable to road traffic injuries Road accident casualties will increase if preventive action is not taken.

THE CHALLENGE OF ROAD SAFETY

Road traffic crashes are one of the world's largest public health and injury prevention problems. The problem is all the more acute because the victims are overwhelmingly healthy prior to their crashes. Hence appropriate road traffic safety measures are required to be put in place. Road traffic safety refers to methods and measures for reducing the risk of a person using the road network being killed or seriously injured (ITF, 2008). The users of a road include pedestrians, cyclists, motorists, their passengers, and passengers of on-road public transport, mainly buses and trams. Best-practice road safety strategies focus upon the prevention of serious injury and death crashes in spite of human fallibility which is contrasted with the old road safety paradigm of simply reducing crashes assuming road user compliance with traffic regulations.

Road accident is an event of collision, overturning or slipping which occur or originate on a road open to public traffic resulting in either injury or loss of life or damage to property in which at least one moving vehicle was involved (Shivakumar & Krishnaraj, 2013). Most of the fatal accidents occur due to over speeding. It is a natural psyche of humans to excel. If given a chance man is sure to achieve infinity in speed. But when we are sharing the road with other users we will always remain behind some or other vehicle. Increase in speed multiplies the risk of accident and severity of injury during accident. Faster vehicles are more prone to accident than the slower one and the severity of accident will also be more in case of faster vehicles.

Young novice drivers are overrepresented in road accidents. Although they quickly acquire the skills needed to control a motor vehicle, it takes much longer for novice drivers to develop the higher-order perceptual and cognitive skills necessary to safely interact with the driving environment (Deery, 1999). Motorized two-wheeler riders in Bangalore city constitute the largest share of fatalities (40%) and cyclists account for about 10 percent. However, if the probability of a

fatal crash is calculated per million km of a particular mode, then the cyclists are about six times more vulnerable compared to motorized two-wheelers. This may be because there are no separate bicycle lanes on arterial roads and bicyclists have to share the left lane with buses (Kharola, Tiwari & Mohan, 2012).

GLOBAL TRENDS

Road accidents are a leading cause of death and injury worldwide. By 2020, WHO (2012) projects that road crash injuries will be the third highest threat to public health, outranking other serious health problems such as tuberculosis, diarrheal diseases, HIV/AIDS, and lower respiratory infections. According to a survey from WHO (2012), each year road traffic injuries take away lives of 1.2 million men, women, and children around the globe and injure many more. In South Asia, road traffic fatalities are expected to increase from 135,000 in 2000 to 330,000 in 2020 (WHO, 2004). That's a 144 percent increase in deaths from road crashes. Accidents are particularly high in low and middle income countries and around 85 percent of the world's road deaths occur in developing countries. The South Asia region has a one fifth share in these fatalities.

Several international organizations are doing their best to improve road travel safety (World Bank, 2013). The World Bank has implemented various measures on road safety in South Asia, and around the world. In 1999, it has also helped to initiate the Global Road Safety Partnership, a unique coalition of business, civil society, and governmental organizations working together to improve road safety around the world in the following manner.

World Bank supported projects in South Asia have focused on helping regional governments to improve policies and regulations and establish road safety agencies. In India, Bangladesh, and Pakistan, the Bank has assisted government agencies in developing comprehensive road safety action plans, at both the national and state level as well as for specific cities like Dhaka and Lahore. The Bank has also assisted in projects which include the development of manuals for safety audit, accident black spot investigations, road signs and markings, and computerized accident recording and analysis systems.

Public awareness campaigns are a key part of the World Bank's efforts to improve road safety; one such project has been created for the National Highway Authority of India. In these efforts, the NGO's have played a vital role. For instance in Bangladesh, NGO's have undertaken comprehensive road safety education and public information campaigns in local communities with the support of the World Bank.

Technical assistance has also focused on designing and constructing better and safer roads. In India, the Bank has assisted in improving hazardous locations on the national highway and state highways, as well as the installation of safer road features and devices. In Bangladesh and the Indian states of Andhra Pradesh, Karnataka, Gujarat, Kerala and Uttar Pradesh, it has provided funding for improvements of accident black spots, installation of reflective traffic signs and road markings.

The Year 2011 was marked by the launch on 11 May 2011 of the United Nations Decade of Action (2011-2020) for Road Safety. On this occasion, the UN Secretary General, Mr. Ban Ki-Moon, called on UN Member states, international agencies, civil society organizations, businesses and community leaders to ensure that the Decade leads to real improvement, and recommended governments to develop national action plans for 2011-2020. In this regard the Indian Government is taking several actions to counter the ever increasing road accidental fatalities.

There are solutions to the road safety problem. A wide range of effective interventions exist, and experience in countries with long histories of motorized travel has shown that a scientific, "systems approach" to road safety is essential to tackling the problem. This approach addresses the traffic system as a whole and looks at the interactions between vehicles, road users and the road infrastructure to identify solutions. There is no single blueprint for road safety. Interventions and strategies that work in one setting may need to be adapted elsewhere.

CONCERN ON THE INDIAN ROADS

The death toll is on the higher side for the countries like India where pedestrians, motorcyclists and passengers are vulnerable and vehicles lack the safety norms. It has a road traffic fatality rate of 16.8 deaths per 100000 population. Approximately half of all deaths on the country's roads are among vulnerable road users like motorcyclists, pedestrians and cyclists.

Though there are laws on driving training, speed, seatbelt wearing, helmet wearing, and drunk-driving, they are poorly enforced. As the nation's economy grows, the number of motor vehicles increase. This means death and injury from traffic accidents are likely to increase, since motorized traffic competes with slower moving non-motorized traffic for road space, especially if measures are not taken to mitigate the problem. In South Asia, motorized traffic has been increasing at a rapid pace, typically over 10 percent annually in major urban areas.

India has the second largest road network in the world with over 3 million km of roads of which 60% are paved. These roads make a vital contribution to the India's economy. On the whole, the facilities for the road users are not up to the mark, leading to large number of accidents. Recently, there is a growing concern over the road crash problem. With the advancement of technology, the most developed projects undertaken along with the real estate are the massive road building projects. While new roads are being built, fast moving vehicles are introduced by automobile manufacturers. Indians are economically progressing in the developing economy and hence more and more people are buying their own vehicles rather than using public transport system which is one of the causes of road congestion and resultant accidents.

Road accidents disproportionately affect the poor, making road safety an economic development imperative. Most of the victims of road accidents aren't even in a motor vehicle. Pedestrians, cyclists and motorcycle riders are the most vulnerable road users and account for the majority of traffic deaths in low and middle income countries. According to World Bank (2013) in Dhaka city, Bangladesh, pedestrians alone comprise almost 75 percent of road accident fatalities. In New Delhi, pedestrians and bicyclists account for around 55 percent, and pedestrians, bicyclists and motor cyclists account for over 80 percent of the total road traffic deaths. The pattern is similar in Colombo, Sri Lanka, where the figures are 45 percent and 80 percent respectively.

The shortage of safe and affordable travel options make things even worse for the poor. Long distance buses are often overcrowded. It is not unusual to see passengers riding on bus roofs increasing the chance of an accident, and risking many lives at once. Road accidents are an economic burden, and pose a major challenge to the health care system. The economic cost of road crashes and injuries is estimated to be 1 to 1.5 percent of gross national product (GNP) for low and middle income countries, about US\$ 65 billion which is more than they receive in development assistance. Critical and often scarce health care resources get consumed by road crash cases. This hurts a country's ability to respond to other health care needs. Road traffic injuries also place a heavy burden on the household finances of the victims and their families. Many families are driven deeply into poverty by the loss of a breadwinner and the added burden of disabled members.

In India road safety is an issue of grave national concern. While improvements in technology may help you drive safely the best way to reduce accidents is to inculcate safe driving habits. Road traffic injuries (RTIs) are one of the leading causes of deaths, disabilities and hospitalizations with severe socioeconomic costs. World Health Statistics 2008 cited in Global Status Report on Road Safety states that at current rates by 2030, RTIs are expected to be the 5th leading cause of death, overtaking diabetes and HIV/AIDS. The report also states that more people die in road accidents in India than anywhere else in the world, including the more populous China.

National Crime Records Bureau (NCRB) of India revealed that at least 13 people die every hour in road accidents in the country. As per statistics there is one road accident every minute and, an accident related death every four minutes in India. Karnataka has the third highest accident rate in India, behind Tamil Nadu and Maharashtra. NCRB states that in the year 2012, in Bangalore alone there were a total of 5502 road traffic accidents with more than 4500 casualties and 700 deaths.

Road traffic on India's more than 3.3 million-kilometre road network, one of the largest in the world, had been increasing by more than 10 per cent annually since 2000. National highways made up only 2 per cent of the network, but carried 40 per cent of the total road traffic, resulting in heavy traffic density. Conscious of the serious development and national health impact of road accidents, India had been working actively to enhance road safety and reduce the adverse consequences of accidents. It had already followed the WHO recommendation to create a lead agency for road safety issues namely the Department of Road Transport and Highways, which formulated road safety policies, and had also created a National Policy on Road Safety in addition to implementing an Annual Road Safety Plan (Sen, 2008). India has collected and analyzed road accident statistics and took steps to further develop a road safety culture by organizing awareness campaigns in collaboration with civil society organizations.

Engineering, enforcement and education are the three aspects of road safety on which India is taking action. The country had signed the 1998 Agreement of the World Forum for Harmonization of Vehicle Regulations in order to adopt international best practices in motor vehicle safety. Smart card-based driving licences and vehicle registration certificates are being issued in many parts of the country, while old laws and regulations are being reviewed and updated. Extensive public awareness campaigns, involving non-governmental organizations and other stakeholders, are organized periodically, as were annual road safety weeks with such themes as "Drive to care! Not to dare!"

The NCRB Report 2012, provides startling revelation of accidental deaths in general and road accident deaths in particular as under. During the year 2012, a total 3,94,982 accidental deaths were reported in the country. Out of which 6,99,804 cases of un-natural accidents which caused 3,72,022 deaths and rendered 5,07,329 people injured were reported in country during 2012. The ratio of male fatality to female fatality due to unnatural accidents was 77.6: 22.4. There is 1.0% increase in accidental deaths during 2012 over the previous year. There is 3.1% decrease in deaths by causes attributable to nature from 23,690 in 2011 to 22,960 in 2012. There is 1.3% increase in deaths by unnatural causes from 3,67,194 in 2011 to 3,72,022 in 2012.

Maharashtra accounting for 9.4% of country's population has reported almost one-sixth (15.7%) of accidental deaths followed by Madhya Pradesh and Tamil Nadu accounting for 6.1% and 5.6% respectively of the country's population. Males out-numbered females in all kinds of accidental casualties due to unnatural causes at the national level except fire accidents (where 66.4% of those killed were females as compared to 33.6% males). The major unnatural causes of accidental deaths were road accidents (37.4%), poisoning (8.3%), railway accidents and rail-road accidents (7.9%), sudden deaths (7.8%), drowning (7.4%) and fire accidents (6.3%).

A total of 4,73,416 traffic accidents were reported during the year 2012, comprising 4,40,042 road accidents, 1,762 rail-road accidents and 31,612 other railway accidents. It is observed that the rate of deaths per thousand vehicles has decreased from 1.3 in 2008 to 1.0 in 2012. Maximum number of traffic accidents occurred in the month of May (38,920) and during 15 hours to 18 hours (73,672). 69.6%, 67.5%, 53.5% and 51.9% of unnatural deaths in Jammu & Kashmir, Nagaland, Uttar Pradesh and Andhra Pradesh respectively were reported due to road accident.

Deaths due to road accidents in the country have increased by 1.3% during 2012 over 2011. 23.2% victims of road accidents were occupants of two wheelers. Rate of accidental deaths per thousand vehicles was highest in Bihar and West Bengal at 1.9 each followed by Andhra Pradesh and Himachal Pradesh at 1.5 each. The month wise distribution of road accidents has shown maximum number of accidents during May (38,920) followed by April (38,474) while least number of road accidents were reported in the month of September (33,224). Maximum number of road accidents (73,672) was reported during 15 hours to 18 hours. Maximum 'rail-road accidents' occurred during the months of February (171). The maximum number of 'railway accidents' were reported during the months of May (2,827) followed by August and October (2,741 each).

Among 53 mega cities, 97.6% and 81.2% of deaths were reported due to road accident in Lucknow and Asansol respectively. Delhi city accounted for 16.1% deaths of pedestrians, 10.0% deaths due to car accidents and 9.5% deaths due to two wheelers, amongst 53 mega cities. Kolkata, the third largest city in terms of population (8.8% of the population of all mega cities), among 53 cities, after Mumbai (11.4%) and Delhi city (10.1%) reported accidental death rate of 5.6 as compared to 41.6 reported in Mumbai and 43.2 reported in Delhi city.

CONSEQUENCES OF UNSAFE ROADS

Road safety is emerging as a major social concern in India. India has the second largest road network in the world with over 3 million kilometers of which 60% are paved. These roads make a vital contribution to the India's economy. On the whole, the facilities for the road users are not up to the mark, leading to higher rate of road accidents. With the advancement of technology, the most developed projects undertaken along with the real estate are the massive road building projects. But while new roads are being built, high speed automobiles are being invented making road safety a crucial question.

Road accidents disproportionately affect the poor, making road safety an economic development imperative. Most of the victims of road accidents aren't even in a motor vehicle. Pedestrians, cyclists and motorcycle riders are the most vulnerable road users and account for the majority of traffic deaths in low and middle income countries. In Dhaka city, Bangladesh, pedestrians alone comprise almost 75 percent of road accident fatalities. In Delhi, India, pedestrians and bicyclists account for around 55 percent, and pedestrians, bicyclists and motor cyclists account for over 80 percent of the total road traffic deaths. The pattern is similar in Colombo, Sri Lanka, where the figures are 45 percent and 80 percent respectively.

The shortage of safe and affordable travel options makes things even worse for the poor. Long distance buses are often overcrowded. It is not unusual to see passengers riding on bus roofs increasing the chance of an accident, and risking many lives at once. Road accidents are an economic burden, and pose a major challenge to the health care system. The economic cost of road crashes and injuries is estimated to be 1 to 1.5 percent of gross national product (GNP) for low and middle income countries, about US\$ 65 billion which is more than they receive in development assistance. Critical and often scarce health care resources get consumed by road crash cases. This hurts a country's ability to respond to other health care needs. Road traffic injuries also place a heavy burden on the household finances of the victims and their families. Many families are driven deeply into poverty by the loss of a breadwinner and the added burden of disabled members.

ROLE OF HUMAN RESOURCE DEVELOPMENT

In India only the motorized road users are required to undergo formal training on driving skills, but gives very little attention in inculcating the knowledge required for safe driving and the attitude needed for safety is not taught at all. It is true that behaviour patterns can be influenced indirectly, as for example by physical changes to roads or their environment. However, although this approach can achieve highly favourable results, it would seem sufficient in only a very few instances. Influencing the behaviour of road users is critical if we have to prevent death and serious injury on our roads. The reality is that if people obeyed speed limits, didn't drink or take drugs and drive, wore a seatbelt helmet and were not distracted when driving the road safety would improve significantly. It is therefore vital to change the behaviour of road users by learning and development interventions.

When considering remedial measures to reduce accidents it must be borne in mind that the most effective remedy is not necessarily related directly to the main "cause of the accident and may even lie in different categories of road, vehicle or road user. This is particularly true of accidents in which the road user fails to correctly analyse all the factors in the road environment; in many accidents the primary cause may be said to be the driver's lack of skill or ability, but engineering remedies to improve the road or to make it safer are often cheaper, easier to effect and have a proven track record.

But training the driver to the necessary degree of skill for all circumstances is extremely difficult. Further, even in circumstances in which human error or the physical state of the driver has been judged to be the sole contributor, it may be possible to influence human behaviour more readily by engineering means than by education or enforcement of legislation. This is not to say that attempts to influence human behaviour within a given infrastructure should not be pursued. Although it is the most difficult area to effect safety measures, when achieved the result can be most dramatic. In sum, an analysis of the various accident factors demonstrates that human factors are highly preponderant, even though a good number of accidents result from a complex of causes. However, uniform or unilateral measures do not always lead to decisive solutions to the problems encountered.

SUGGESTIONS AND RECOMMENDATIONS

Therefore, there is a need to: define global strategies covering education, the technical improvement of the road environment, information, regulations, controls and sanctions; aim the measures selected at the relevant targets, i.e. the different categories of user and take better account of regional and local accident realities in order to formulate more effective prevention programmes. Traffic safety education has always been regarded as a way of influencing the behaviour of road users. Traditional education programmes have mainly been directed at children, young people and prospective holders of driving licenses. During recent times, traffic safety education has acquired a wider perspective and it is now viewed as an integrated whole.

Traffic safety education should be both theoretical and practical. Practical training is a very important form of road safety education. In its broadest sense, traffic safety education also includes information measures (dealt with in the following chapter) and further education measures (retraining and refresher courses) following basic training. Road safety measures fall into three main categories: improving road user behavior (by means of education, information,

regulation, monitoring and supervision, and penalties), improving vehicle safety, and developing safer road infrastructures. All contribute in their own way to reducing accidents and casualties. The extent to which they do so depends on the key factors in accident causation. Measures aimed at safety improvement must take account of how susceptible a particular factor may be to influence and change. In general, changes in road layout – “safety engineering” – have a more immediate and quantifiable effect on accidents than attempts to change behaviour by publicity.

Managing safer road transportation in India is a complex problem requiring multi prolonged strategies succeed. The aspects of both driving skill and driving style appear to contribute to road accident risk. Of the former, hazard-perception latency appears to play an important role, and this may be attributable to generalized abilities to identify visual targets in a complex background and to switch attention rapidly. Of the latter, faster driving speed and willingness to commit driving violations increase crash risk, and these factors may be explicable in terms of personality and antisocial motivation.

According to IRTE (2012) out of the estimated 1.4 million serious road accidents/collisions occurring annually in India, hardly 0.4 million are recorded. Further, only a minimal percentage of these collisions are scientifically investigated, in the absence of which, the real causes and consequences are never known. Therefore remedial measures as well as punishment for the violators are also arbitrary. On account of various political and socio-economic conditions, generally, the larger vehicles are often labeled the culprit in cases of vehicle-to-vehicle crashes. Road safety can only be improved when we understand the causes and consequences of road accidents/collisions so as to work out remedial measures.

Drivers sometimes find themselves at the wheel following a happy or unhappy event related to their work or their social and family life. Differences in the allocation of attention, changes in a decision or in the carrying out of a decision can therefore occur. These effects might be understood in the light of motivational consequences of loss of control.

Behavioural adaptation has been a focal concept in traffic psychology since the mid 1970's. Much effort has been used to define it, and many models have been devised to describe and explain it. However, these attempts sometimes are at risk of confusing the general phenomenon and mechanisms underlying it. This paper defines the behavioural adaptation as a tendency of the driver to react to changes in the traffic system, whether they be in the vehicle, in the road environment, in road and weather conditions, or in his/her own skills or states, and that this reaction occurs in accordance with his/her motives. Very obviously, this kind of adaptive behaviour occurs at many levels of the functional hierarchy of driver behaviour.

Therefore, risk-related behaviour should be considered at several levels with different mechanisms to produce behavioural adaptation, often called 'risk compensation'. At a high level, trip decisions modify populations at risk in different circumstances, sometimes calming and sometimes amplifying population risk differences. For example, elderly drivers tend to avoid difficult conditions and succeed in keeping the fatality risk per person at a moderate level, while young male drivers at the other end of the continuum use cars very dangerously at nights on weekends.

At a low level of vehicle control and guidance in real dynamic traffic situations, simpler control mechanisms which result in behavioural adaptation can be identified. Among these mechanisms, maintenance of safety margins and proper attention allocation play a major role. All these effects influence the end result of accident risk as separate mechanisms.

Young drivers' accident involvement may be explained by a number of different factors, one of which is that they tend to overestimate their skill in driving a car. Attitudes toward traffic safety are directly associated with risky driving behaviors while having direct effects on attitudes toward traffic safety, personality traits are also found to influence risky driving behaviors indirectly mediated by traffic safety attitudes.

In considering the human contribution to accidents, it seems necessary to make a distinction between errors and violations; two forms of aberration which may have different psychological origins and demand different modes of remediation. While errors are unintended lapses; violations are intentionally committed with the full knowledge of consequences.

WHO (2012), report states that the need for more tension, risk and adventure in their lives (people having high risk personality) exhibit a driving style characterized by such actions as travelling at excessive speeds and carelessly changing lanes. Subjects who report taking more risks for its arousal and pleasurable sensation are more frequently convicted of speeding violations and other traffic violations.

The human and economic damage caused by road crashes is largely preventable (World Bank, 2013). Flaws in road design and engineering, coupled with driver behavior, can be overcome with concerted effort. In South Asia, governments so far have been slow to cope with the growing level of traffic. Setting up agencies with a separate budget and the power to enforce regulations to address road safety at an institutional level would be an important step forward.

Lack of awareness and consciousness about road safety among road users, planners and engineers, exacerbates the problem. Drivers, for instance, are often not conscious of the inherent risks of high travel speeds, and overcrowded passenger buses. This problem can be mitigated with public awareness campaigns, improved driver training and testing, and better trained enforcement personnel and engineers. Standardizing the collection of collision data can also bridge a very significant informational gap.

Road safety audits should be introduced by road agencies as an important crash prevention measure. Important design and traffic calming measures such as median drivers, speed bumps, rumble strips, road markings, traffic signs, and roundabouts are usually not present in most of these countries. Moreover, because much of the traffic in developing countries consists not of motorized vehicles but rather bicycles and pedestrians, the building of separate non-motorized traffic and motorcycle lanes to ensure the smooth flow of traffic and a safe environment is very important.

Improving road travel safety in India will therefore require several measures like (1) training of drivers both in (a) technical aspects of driving as well as (b) empathetic understanding of the harm caused to the victims; (2) effective enforcement of safety norms by education, implementation and punitive measures; (3) incorporating safety devices in vehicles; (4) recognizing safe driving behaviour; (5) providing suitable footpaths and pedestrian crossing for those do not travel in vehicles, and (6) building and maintaining proper road infrastructure

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