Mobility Hazard On Indian Roads : A Consequence Of Inept Traffic Management

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INTRODUCTION

The processes of globalization has made the existence of efficient transport and logistic systems in the delivery chain an absolute must, the easy accessibility of road transport, its elasticity of operations and reliability have earned it an increasingly higher share of both passenger and freight traffic vis-à-vis other transport modes. So while on the one hand, road transport conveys many benefits like allowing personal mobility and proving to be a critical lubricant for economic growth, yet, all this is accompanied by an inevitable cost. One of the most potent outcomes of higher mobility is the phenomenal rise in road traffic accidents that can well be termed as an area of critical health concern, given the epidemic proportions that it is assuming.

According to Mohan, Tiwari, Khayesi and Nafukho (2006), currently around 1.3 million people around the globe lose their lives annually as a result of road traffic collisions, with about 20-50 million people being injured or disabled. Road Traffic Accidents (RTAs) account for 2.2% of all global deaths, annually making it the ninth leading cause of global deaths and by 2030, it is projected that RTAs will be the third-leading burden on health worldwide, exceeded only by cardiovascular diseases and major depression (World Health Organization, 2008). Thus, the escalating road safety problem represents a health, social and economic disaster, especially for the developing countries. This research paper is an attempt to highlight the RTAs as a critical area of concern in India, and a serious outcome of inefficient road traffic management. The study analyses requisite statistical data to highlight the severity of the situation and also emphasizes upon improving the road traffic management to mitigate the risk on the Indian roads.

THE HAZARD OF RTAs IN INDIA

India has only 1% of the world's vehicular share, but accounts for 10% of the world's road traffic accidents (The Tribune, 2009). The economic losses from RTAs in India have been estimated to be as much as ₹ 55000 crores (Financial Express, Jan 2007) or at least 3% of the GDP. RTAs contribute to the maximum number of fatalities vis-à-vis other causes of unnatural[1] death occurring from both natural and unnatural disasters (National Crime Records Bureau, 2007).

From the Table 1, clearly, RTAs are the single largest cause of unnatural deaths in India, amounting to 33.6% of the total unnatural deaths in 2007 by various causes. The trend shows a continuous increase in the growth of fatalities by RTAs, touching an increase of 8.4% from 2006 to 2007. Despite this alarming rise in fatalities by RTAs, they have received meager attention as a critical area of concern and predicament that needs timely remedial and preventive action.

Trends over the last four decades can be observed from the Table 2, which reflects a tremendous growth of the motor vehicles, averaging 214% accompanied by an equally alarming rise in RTA fatalities averaging 77.2%. Thus, one negative externality owing to the rapid urbanization, expansion of the road networks and motorization in the country has been the multifold increase in RTAs. In India, the RTA fatality for the year 2001 was 80,800 as indicated in the Table 2, amounting to a death every 6.5 minutes. As per the data available for 2007, around 1.14 lakh deaths from RTAs occurred in 2007(National Crime Records Bureau, 2007), amounting to a death by RTA every 5 minutes. According to the Annual Report of the Ministry of Road Transport and Highways, 2007-08, India's road network[2]

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[1] The National Crime Records Bureau of India has identified and maintained statistics of 12 causes of unnatural deaths attributable to nature such as earthquakes, cyclones, floods, avalanches, etc. In context of the unnatural disasters, 18 causes have been identified such as traffic accidents, drowning, fire, poisoning, electrocution, etc.

[2] Comprising of National Highways, Expressways, State Highways, Major District Roads, Other District Roads and Village Roads.

Table 1 : RTAs Vis-a-vis Other Causes of Unnatural Death						
	Cause	2006	2007	%		variation 2006-2007
		Fatalities	%	Fatalities		%
1	Causes attributed to nature	21502	6.8	25153	7.4	17.0
2	Rail-Road & other railway accidents	25927	8.2	25970	7.6	0.2
3	Drowning	25571	8.1	27064	7.9	5.8
4	Fire accidents	19222	6.1	20772	6.1	8.1
5	Sudden Deaths	19450	6.2	21311	6.3	9.6
6	By Falls	9821	3.1	10497	3.1	6.9
7	By Electrocution	7619	2.4	8076	2.4	6.0
8	**Road Traffic Accidents**	**105725**	**33.6**	**114590**	**33.6**	**8.4**
9	Poisoning	23434	7.4	25447	7.5	8.6
10	Causes not known	14713	4.7	16907	5.0	14.9
11	By other unnatural causes	41720	13.3	45007	13.1	7.8
	Total	**314704**	**100**	**340794**	**100**	**8.5**
Source: Computed from National Crime Records Bureau Data , 2007.						

Table 2 : Trends of Decadal Population and Vehicular Growth and RTAs In India					
	1971	1981	1991	2001	2011(P)
Registered Vehicles(millions)	1.865	5.391	21.374	54.991	141.326
% growth of registered vehicles	--	189%	296%	157%	157%
Total Population	548159652	683329097	843930861	1027015247	1249774854
Total RTAs	114100	153200	295131	405637	557507
Fatalities (000)	15.0	28.4	56.6	80.8	115.3
% growth of Fatalities		89.3%	99.3%	43%	43%
Fatalities/1000 Population	0.027	0.0415	0.0670	0.0786	0.092
Fatalities/1000 Vehicles	8.04	5.27	2.65	1.46	0.81
Source: Computed from Census of India Series 1971-2001 and Motor Vehicle Statistics, Ministry of Road Transport and Highways.					

totalling to 3.314 million kilometers, is one of the largest in the world. About 65% of the freight and 86.7% of the passenger traffic is carried by the roads. Thus, for every 1000 kms of road length in India, the fatality rate works out to be 35. Based upon the trends, it can be foreseen that the magnitude of the RTA menace, is by all means, likely to swell in times to come and ,therefore, demands curative interventions on a priority basis.

The Table 3 displays figures pertaining to the gender and the total number of fatalities by the vehicular types. In terms of the percentage share of total deaths by the vehicular mode, the fatalities by truck/lorry occupied the top slot, followed by the two wheelers, which actually comprise the largest percentage in the modular split of the vehicles, accounting for more than 71.4% of the total motor vehicles in 2004, while cars accounted for 13%, buses 1% and goods vehicles (trucks/lorries) 5%. Incase of both males and females, the maximum fatalities can be attributed to RTAs involving goods vehicles, two wheelers and buses followed by other modes.

CAUSES OF RTAs AND INADEQUACIES OF ROAD TRAFFIC MANAGEMENT

The term road traffic management is used to express the means and methods adopted to utilize the road systems of a town/city to an optimal level, while at the same time, granting safety, efficiency and convenience. As such, traffic management comprises precisely of three measures i.e, planning and engineering measures, enforcement measures i.e, traffic controls and regulations, and education and awareness measures.

Table 3 : RTA Fatalities By Type of Vehicles, 2007						
Type of Vehicle	Number of Road Accident Deaths					% Share Of Total Deaths By The Vehicular Mode
	Male	% Male deaths to Total Male Deaths	Female	% Female Deaths To Total Female Deaths	Total	
Truck/Lorry	21589	22.1	3060	17.8	24649	21.5
Bus	10547	10.8	2317	13.5	12864	11.2
Tempo/vans	4928	5.0	1096	6.4	6024	5.3
Jeep	8029	8.2	1643	9.5	9672	8.4
Car	8301	8.5	1631	9.5	9932	8.7
Three wheelers	5322	5.5	1156	6.7	6478	5.7
Two Wheelers	19082	19.6	2790	16.2	21872	19.1
Bicycle	2870	2.9	235	1.4	3105	2.7
Pedestrian	8351	8.5	1774	10.3	10125	8.8
Others	8379	8.6	1490	8.7	9869	8.6
Total	**97398**	**100**	**17192**	**100**	**114590**	**100**
		84%		**16%**		
Source: Computed from National Crime Records Bureau Data, 2007						

As far as the causes of RTAs in India are concerned, it can be said that accidents and fatalities are a result of interplay of a number of factors, wherein no one factor can be held solely responsible for the same. The Central Road Research Institute, India has identified sixty five factors pertaining to road traffic management that can be grouped under the headings of traffic conditions, road geometry and design, vehicle factor and driver responses. Poor road geometrics, coupled with poor traffic management system emerges as one of the prime causes of road accidents. As has been analyzed earlier, that the vehicular population has grown multifold due to a substantial increase in travel demand, thus generating massive flows. The urbanization process has also significantly contributed to the rise in the travel demand. Simultaneously, the mobility rates [3] have also increased dramatically, especially in case of metropolitan cities. The process of urbanization has led to an overspill and urban sprawl in terms of the physical expansion of the settlements, wherein the cities are continuing to expand in size in order to create more space for accommodating additional population and activities within its fabric. Consequently, the average trip lengths have also risen proportionately. A study of Delhi (Singh, 2005) reveals that the average trip length in case of the Delhi Transport Corporation (DTC) Buses increased from 6.4 kilometers in 1972 to nearly 18 kilometers in 2005. The rise in travel demand, accompanied by an increase in mobility rates, and trip lengths brings a glut of vehicles on the road, thus contributing to an increased risk of conflicts and subsequent fatalities.

Indian Cities are characterized by a heterogeneous traffic, wherein the Non-Motorized Transport (NMT) constitutes a significant share of the total traffic. The share of NMT at peak hour varies from 30-70%. Consequently, plying on the same routes, the conflicts between motorized and NMT give rise to a large number of accidents (Tiwari, 2000). Till date, the NMT modes have not been given any significant priority, while designing road systems and related infrastructure continue to be sidelined in policy matters as well. It has to be well understood that in Indian conditions, in order to design sustainable transport systems, the NMT modes cannot be ignored. Another major cause is the fact that road systems and related infrastructure has not kept pace with the growth of the motor vehicles. The road infrastructure design is based upon homogeneous models that fail to fulfil the mobility and safety requirements of the heterogeneous traffic mix. Consequently, all modes use the same road space and the differences in the speed and conflicting modes sharing the same space results in RTAs (Mohan, 2004).

The volume and pattern of road traffic, and hence the number of accidents and casualties are affected greatly by landuse. But although the connection between landuse and transport has been recognized, the possibilities of changing landuse as a way of tackling transport problems has not really been well explored. The absence or lack of

[3] Mobility rates refer to the average number of trips per person per day.

landuse zoning and the large-scale encroachments on to the road, especially by the informal sector, reduces the net effective width and increases the chances of conflict (Mohan and Tiwari,1999). Road design and conditions as poorly designed intersections faulty alignments, faulty placement of roadside furniture, encroachments and poor maintenance lead to greater risk and accidents. Landuse policies that encourage a greater use of personalized modes increase the exposure rates and the risk of death or injury by RTAs.

Institutional weaknesses and poor enforcement of traffic safety rules are also cited as the major reason for the rapid increase in accidents. In the absence or poor enforcement of traffic calming measures, motorized modes move at high speeds, increasing the risk to the non - motorized users (ibid). According to the Report on Road Traffic Injury Prevention, 2004, the probability of the fatal injury increases from 0% to almost 100% as vehicle speed increases from 20kms /hour to 100 kms /hour. In terms of impact with heavy vehicle, severe injuries can be sustained even at velocities lower than 30km/hour. Thus, even a small increase in speed can result in a large increase in death and injuries (Mohan and Tiwari, 1999). Motorists generally do not adhere to speed limits, but instead, choose speeds that they perceive as acceptably safe. Besides the behaviour of the drivers in terms of road rage, driving under the influence of alcohol and drugs, and the recent use of hand held mobile phones (Rawat,2005) are also contributory factors. Though the use of mobile phones while driving has been banned under the Central Motor Vehicles Rules since March 2001, the enforcement of the same as also other provisions of the Motor Vehicles Act, 1989 continues to remain largely ineffective. Road markings and lane markings are either not marked or if marked, are not clearly visible, and the traffic signs are often obliterated by roadside hoardings and advertisements.

Another cause to be cited in this context is the highly ineffective public transport system in Indian cities. In fact, a look at the modal growth of vehicles indicates that the share of bus transport is just 1%. The deterioration and lack of upgradation in most Indian Cities has also pushed the people towards the use of more personalized modes. The deterioration is more prevalent in metropolitan cities, where there is an excessive concentration of vehicles (Singh, 2005). While some cities like Jaipur, Ahmedabad and Delhi have gone for the implementation of the Bus Rapid Transit Systems (BRTS) systems for encouraging public transport usage, it still needs to be seen how effectively these systems can work within the holistic framework of a sustainable transport system.

Whatever be the causes of RTAs, the truth is that they are fast becoming an epidemic and contribute heavily in lowering the quality of life of the victim, the household or society at large.

THE WAY FORWARD

The gravity of the situation in context of mobility can been concluded from the present paper. Thus, it is apparent that one of the most pressing issues in context of transport safety today is how to curb the epidemic of road deaths and injuries. It is ,therefore, important that a sustainable transport system be developed, which is capable of providing mobility and accessibility to all residents in a safe environment. An effort needs to be made to reduce the glut of vehicles on the roads, and this can be done only by devising ways to reduce personalized modes, which occupy the highest percentage share in vehicular compositions. This is possible only if the public transport system is made more efficient in terms of its availability and safety (Mohan and Tiwari, 1999). The Mass Rapid Transit System (MRTS) that provides cheap travel, has higher levels of safety and has the lowest space requirements per person (2.5 sq. metres as compared to 40.0 sq. metres in case of a car). The MRTS system is presently operational in four cities of India, i.e. Mumbai, Calcutta, Delhi and Chennai. A serious thought regarding application of the MRTS system for the mega cities, and an efficient bus based public transport system for the rapidly growing cities such as the BRTS (Bus Rapid Transit System) has to be examined and operationalized to achieve smooth traffic operations, as also to reduce the glut of personalized modes on the roads.

Integrated landuse planning is another factor that can bring about a sea change in the mobility patterns in settlements. The movement is primarily a function of landuse (ibid) . As observed, in the case of urban areas, mixed landuses and one C.B.D invite a larger number of trips, wider composition of modes, and intense traffic congestion. Instead of one city centre, there should be a series and hierarchy of commercial centres, combined with residential areas, so that trip distances are reduced. Landuse planning should ensure optimal layouts that shall result in cutting down the rate of trips and reduce vehicular congestion on the roads (Ghai,1997).

The non-motorised modes of traffic shall continue to play a vital role and ply on the Indian roads in times to come as well. Segregation of motorized and non-motorized modes of traffic is ,therefore, essential. This could be achieved by

implementing design measures aimed at separating the traffic streams by directions and speeds, i.e. by providing special lanes on the roads which are high-volume carriers and additional lanes at places of greatest constriction of the traffic streams. Since a majority of the non motorized mode comprises of the cycle and cycle fatalities, it is a must to have separate cycle lanes.

Encroachments by the informal commercial sector parkings and even by pavement dwellers are the key reason for the reduction of the net effective road width and increasing congestion on the already narrow roads. It is ,therefore, essential that the encroachments of the roads right of way should be prevented by the concerned authorities. Elimination of *'black spots'* and reconstruction of problematic stretches and junctions can have a positive effect on road safety. Use of accident data should also be incorporated in planning reconstruction and realignment of roads.

In order to strive in the direction of safer mobility, it is highly essential to regulate the behaviour of the road user, the driver in particular, since most accidents are attributed to human error (Mohan and Tiwari,1999). Licensing should be done in the strictest manner, wherein important aspects of road safety, knowledge of traffic rules, road signs and knowledge about penalties are examined while testing driving skills. Besides the drivers of the motorized modes, there is also need to create awareness amongst the pedestrians and cyclists and drivers of other non-motorized modes such as the cycle-rickshaw and the animal drawn carts, regarding the correct norms of behaviour while on the road. Thus, there is a necessity to introduce traffic education in schools as also organize awareness camps for the lower-income groups who do not have access to formal education, but constitute a majority of the users of the non motorized modes of traffic, including pedestrians.

Most road accidents are also a result of poor enforcement of traffic rules, including the use of safety gadgets such as helmets and seat belts. Constant checks by the traffic police must be undertaken to prevent unskilled drivers from coming on the road and prevent speed-related violations. Moreover, the law enforcing agencies should also ensure that the provision of the Traffic rules enforcement laws, which provide legal sanctity to rules and regulations, are strictly observed. The Motor Vehicles Act, 1989 is the main legislation that has regulatory provisions for traffic management and control. While legislation and associated rules may exist, it is stated that the same are poorly enforced due to which the road users continue to be at risk. RTAs are seen as an area of public health concern under the National Public Health Policy 2002, and the policy envisages the establishment of well equipped trauma care networks in larger urban agglomerations to reduce accident mortalities.

The National Urban Transport Policy 2006 recommends a number of initiatives such as encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education, and other social needs, especially for the marginal segments of the urban population is improved. It also recommends bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus and enabling the establishment of quality focused multi-modal public transport systems as also a number of other policy initiatives that if implemented, could greatly mitigate the threat on the roads.

The National Urban Transport Policy, 2006 also recommends the formulation of a road safety policy. In this context, a draft of the National Road Safety Policy was recommended by the Sunder Committee on Road Safety and Traffic Management in February, 2007. The Committee was of the view that the Government of India should make a commitment to bring about a significant reduction in morbidity and mortality from road accidents. The Committee has also recommended setting up of a National Road Safety Agency for India. The Committee came to the considered conclusion that a nodal national body for road safety in India should not be just a Directorate in the Ministry, but a dedicated agency, established through law, in order to provide for continuity, expertise and credibility. For this purpose, a comprehensive National Road Safety and Traffic Management Act[4], 2007 duly approved by the Committee was forwarded to the Ministry of Road Transport and Highways and subsequently, to the Government of India for approval. The main objective of the Act is to provide for the establishment of National and State Level Road Safety and Traffic Management Boards for the purpose of orderly development, regulation, promotion and optimization of modern and effective road safety and traffic management systems and practices, including improved safety standards in road design, construction, operation and maintenance, and production and maintenance of mechanically propelled vehicles and other related matters.

Some other important initiatives include the need for the decriminalization of road accidents so that the post crash

[4] The Draft of the National Road Safety and Traffic Management Act, 2007 was initially drafted by TERI, and later vetted and modified by Swarup &Co., an eminent law firm, to ensure that it met the requirements of law and the Indian Constitution.

responses can be speedy and save lives. Earlier, the traffic accidents have been essentially registered as medico legal cases, and as a result of this, the administration of medical aid to road accident victims has often been delayed. The Committee on Road Safety and Traffic Management has also recommended constituting a highway police force to enforce road safety on the National Highways and availability of emergent services to speed up relief to the crash victims. Finally, all the recommendations and suggested initiatives in the National Urban Transport Policy, 2006 need to be implemented in a participatory manner involving all stakeholders, be it the national or state government agencies, the private sector, and the community, while being extra sensitive to the poor and vulnerable sections of the society, who are at a greater risk while plying on the roads.

CONCLUSION

Based upon the above discussion and analysis, the gravity of the challenges posed by RTAs becomes fairly evident. It is ,therefore, recommended that RTAs are recognized as a serious mobility risk and ,therefore, the requisite corrective and remedial measures are undertaken to address the same. From time to time, the Government of India has come out with legislation and policy initiatives as mentioned above to address the menace of RTAs. However, the failure in addressing the same appropriately is largely due to poor enforcement and lack of implementation. Proper implementation can go a long way in reducing, if not completely mitigating, the risk of mortality on the Indian Roads.

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