

THE SAFETY OF PUBLIC TRANSPORT SERVICES IN NEPAL AND INDIA IN AN ENVIRONMENT OF DEREGULATION AND PRIVATISATION

By

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Abstract

South Asian countries are characterised by rapid urbanisation, high growth rates in traffic and congestion, decreasing regulation of public transport and increased privatisation of the sector. The majority of the population of such countries is dependent on public transport services to meet their mobility needs. The need for safe, efficient and effective public transport is essential to ensure adequate and affordable accessibility and the continuing sustainable development of livelihoods.

This paper highlights the extent and causes of public transport road accidents in Nepal and India within the context of deregulation and privatisation of the sector and makes recommendations to reduce both the severity and number of public transport accidents in the future.

Background

Worldwide, there are estimated to be approximately one million road accident fatalities each year and 10 million people injured, many with long term disabilities (World Health Report (1999) Tables 2 and 4). Almost 70 per cent of these occur in the developing world. Whilst there is a general decline in the number of fatalities in industrialised countries, the opposite is true elsewhere. If account is taken of levels of motorization by expressing accident statistics as rate per registered vehicle, then less developed countries (LDCs) have rates at least 10 to 20 times higher than the best industrialised countries. The worst countries in these terms have fatality rates 100 times higher as shown in Figure 1 (Ghee et al 1997).

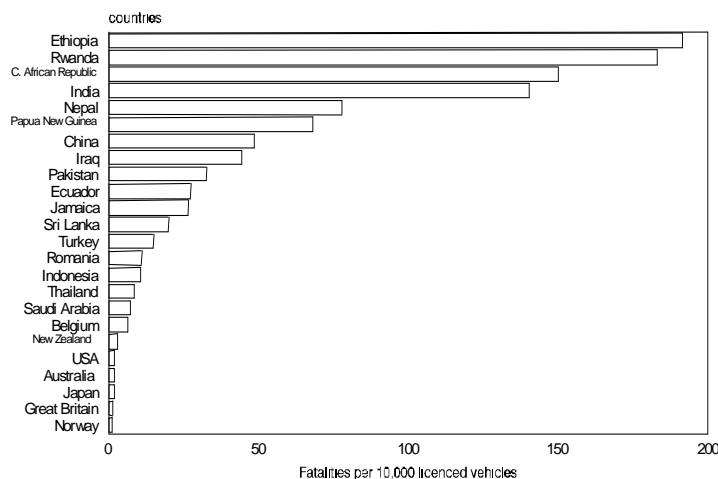


Figure 1 Fatality rates for selected countries

Fouracre and Jacobs (1976) calculated that, for any country, the cost of road accidents was equivalent to approximately one percent of its Gross National Product (GNP) although currently it is thought to be between 1.0 and 3.0 percent. However, using the one- percent figure gives an estimated annual global cost of road accidents of the order of US\$230 billion. This translates to a cost to LDCs being around US\$36 billion, a sum that they can ill afford.

Countries of the developing world (including South Asia) are characterised by rapid urbanisation, high growth rates in traffic and congestion, decreasing regulation of public transport and increased privatisation of the sector. The majority of the developing world's inhabitants are dependent on public transport services and the need for efficient, safe and effective public transport is essential to ensure adequate and affordable accessibility for urban

and rural residents. Naturally continued development is made less sustainable when large numbers of breadwinners are being killed or injured without even considering the cost to the nation.



Plate 1 Typical private long-distance luxury coach in India



Plate 2 Typical private local bus in Nepal

The Transport Research Laboratory (TRL), funded by the UK Government's Department for International Development (DFID) is currently evaluating the safety and roadworthiness of public transport vehicles by assessing the scale of the problem resulting from road accidents and the effect of varying maintenance practices on bus fleet roadworthiness. The effects of accidents on passenger comfort and safety are also being investigated and recommendations developed for safer public transport services.

The 3-year study, which commenced in July 1997, is being undertaken in a number of countries which are assumed to be representative of the developing world in terms of sector environment, income, ownership and regulation. Studies have already been undertaken in India, Nepal, Tanzania and Zimbabwe and analysis of the final study in Thailand is underway. Accident data have been collected from official sources in the countries and interviews undertaken of police, bus owners, operators, drivers, conductors, passengers and associations to obtain opinions as to the causes of bus accidents. Finally, vehicle condition and driver behaviour are monitored. This paper highlights the findings for Nepal and India.

NEPAL

The first bus services operated in Nepal commenced in 1957 and since then the fleet has grown substantially. Traffic Regulations came into force during 1963 and the National Transport Management Act was enacted in 1965. These laws provided the legislation to licence drivers and vehicle operators and were the forerunners to the present legislation. The present legislation is the Vehicle and Transport Management Act enacted in 1992 and is the definitive legislation in terms of the provision of public transport services in Nepal, at present.

There has been a considerable and continuous growth in the bus sector since 1957. By 1996 there were a total of 7800 buses and 2752 minibuses estimated to be operational throughout the Kingdom (Maunder et al, 1998).

About 95 per cent of buses are owned and operated by the private sector, the remaining 5 percent being owned by the public or semi-public sector. Thus the sector can be described as overwhelmingly privately owned. Although vehicles are mainly operated on an individual basis, the "Dial system" predominates as Associations or Syndicates manage routes on behalf of owners. The "Dial system" ensures equal operational trip making for each operator in the Association/Syndicate, as vehicles have to stand in queue and wait for their time to operate. It does however, constrain the number of trips made by a bus /operator. Thus although the supply of permits is liberalised, the actual provision of services is constrained by what amounts to a cartel of operators in districts throughout most of the country. In addition, owners who do not belong to an Association or Syndicate frequently encounter operational difficulties at bus parks.

Bus services are defined under the Act as: "local, short, medium, long distance (day) and long distance (night) services". Vehicles of 6 years or less are operated on long distance night services whereas vehicles aged between 6 and 10 years (some in excess of 20) tend to be operated as local buses. In practice these tend to be within and around urban areas but can include some of the worst maintained roads in the Kingdom.

Accident rates

During the period July 1995-June 1996, a total of 3379 accidents were reported to the police nationally (urban and long distance) with bus accidents representing 14% of the total. However the 479 serious bus accidents resulted in 365 fatalities and 1751 injured persons. The totals representing 39 percent of all road fatalities during the 12 month period and 60 percent of all road casualties (figures for the 18 month period of November 1996 to April 1998 are similar in terms of the percentage of bus accidents and fatalities). Bus accidents therefore represent a significant proportion of all road accidents and injuries in the Kingdom of Nepal.

Figure 2 illustrates the predominance of injuries and accidents caused by bus only accidents in Nepal for 1995/6. Bus-only accidents are defined as those in which the driver loses control and the bus either leaves the road or

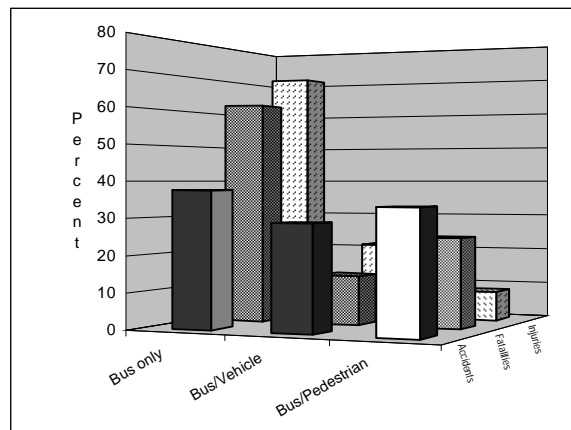


Figure 2 Bus accidents in Nepal [1995-6]

overturns. These are the most frequently occurring bus accidents resulting in 71% of total injuries and 63% of fatalities. Of the remaining bus accidents, bus/vehicle collisions resulted in 21% of injuries and 14% of fatalities and bus/pedestrian 8% and 24% respectively. Unsurprisingly, pedestrians are very much at risk and are more likely to die than be injured if hit by a bus.

It might be expected that most bus accidents would happen at night when driving conditions are more difficult but only 25% happened at night and were no more severe in terms of casualties than day time accidents.

Probable Causes

From comments made by the diverse groups interviewed, the likely causes of bus accidents can be categorised as follows:

- Drivers and driving habits
- Vehicle condition
- Road condition
- Other factors.

Most agreed that one single factor was unlikely to cause an accident and that a combination of causes was likely. The factors raised in respect of drivers and their driving habits were:

- Ease of obtaining a Heavy Vehicle licence
- Lack of professional driver training
- Lack of knowledge of the Highway Code
- Driver fatigue due to long working hours
- Overloading of vehicles to maximise revenue
- Night drivers consuming alcohol or drugs
- Speeding.

At the present time in Nepal there are no Heavy Goods Vehicle Driving Schools so drivers, even if they wished to, are unable to learn to drive correctly. Generally, inexperienced drivers learn to drive in the bus parks when serving as assistants and/or helpers and are coached by existing drivers who ensure their own bad habits are replicated by the novice drivers (many of whom are illiterate). These drivers then attempt the written test, attend the interview and take the practical driving test that is usually undertaken within a compound rather than on the road.

The "Dial system" entails queuing and waiting in turn and consequently most buses are said to be overloaded at certain sections on the route by goods or passengers as drivers/operators attempt to maximise fare revenue. The system also leads to drivers waiting around for hours in the bus park prior to operating the bus. Consequently they are tired before driving as they cannot disappear from the bus park for fear of losing their place in the queue and so do not sleep but sit around chatting in groups.

Interviewees suggested that drivers worked excessive hours in order to make additional trips and obtain extra allowances. Some also share (unofficially) the fare revenue. Drivers also mentioned the use of drugs and alcohol as aids to alertness. Many stallholders provide free meals and refreshments to drivers en route as this will provide passengers as potential customers of the stall.

Surveys of vehicle condition were performed by TRL in Kathmandu and Butwal throughout the operational day. It was observed that 65% of buses had one or more faults in terms of tyres, wheel fixings, front/rear lights. Yet all had passed an annual Vehicle Fitness Test and were legally fit to operate.

The condition of the vehicles gives rise for concern, as these are the vehicles with the potential for causing large numbers of casualties if they are involved in accidents. The fact that all had Fitness Test Certificates illustrates the irrelevance of the scheme and the ease of obtaining a certificate whatever the condition of the bus.

Overall, factors affecting vehicle condition were found to be:

- Lack of maintenance due to cost
- Worn tyres and fake parts used to minimise costs
- Age of the vehicles
- Irrelevance of the annual Vehicle Fitness Test.

Road condition, a lack of road maintenance, poor alignment and a lack of traffic signs and safety features were all identified as possible accident causes along with weak enforcement of traffic regulations. A lack of road sense by pedestrians in rural areas especially when herding animals or generally crossing the road was also mentioned as a factor.

INDIA

The rate of growth of registered vehicles in India has consistently been above 10% per annum and, with its traffic mix of motorised and non-motorised vehicles competing for space, a burgeoning road accident crisis has developed. Thus during 1995/6, the latest year for which reliable data are available, there were 260,700 reported accidents throughout India's road network leading to 60,400 fatalities and 261,00 injuries. Thus, in a year, almost one person in 2500 is likely to suffer injury or death on India's roads and, if it is assumed there is considerable under-reporting, the situation is a lot worse.

Public transport in India is characterised by a wide range of vehicle types from non-motorised modes such as cycle rickshaws and tongas to surface rail and metro. Both public and private ownership exists in terms of road based public transport. The role of public sector operations in road passenger transport has, however, increased since independence and there are now 65 State Passenger Transport Undertakings with a combined fleet of 110,000 buses [about 30% of the national bus fleet].



Plate 3 Bus awaiting repair in India

Recently the Government of India has put increasing emphasis on private participation in all realms of industry including passenger transport.

Privately owned bus fleets are much smaller. Operators tend to function in small units that are regulated by Transport Authorities. In recent years the trend in favour of the public sector has been reversed and the relative importance of the private sector has increased, reflecting the scarcity of public capital for investment in public sector undertakings and accumulating losses.

Maharashtra State

The State of Maharashtra in Western of India has a mix of manufacturing industry, agriculture and the bustling financial centre of Mumbai; it is one of the most prosperous states in India.

During the period 1961 to 1996 the registered motor fleet grew by over 40 times whilst the road network increased by 3.5 times. Thus the growth in vehicles has far outpaced that of the road network and associated infrastructure. The problem is further aggravated by a combination of fast and slow moving vehicles simultaneously claiming usage of the same road space. Consequently, between 1975 and 1995, the number of road accidents increased by 113%, fatalities by 282% and injuries by 220%. An average of 200 accidents were reported daily resulting in 23 fatalities and 134 injured persons.

During 1991 a total of 23% of accidents [38% of fatalities] occurred on the State Highways, state roads accounted for 14% and 27% respectively and other roads 63% and 35%. The Police attributed 66% of accidents and 80% of fatalities to poor driver behaviour. During the same year the registered bus fleet in the State accounted for 1% of the total motor fleet yet buses were involved in 14% of reported accidents and 12% of fatalities (buses from other States will be operational on the State's road network during the year).

Data for 1995 from the Transport Commissioner of Maharashtra suggests that buses and HGV's were involved in 35% of accidents, taxis cars and jeeps in 32%, two-wheelers in 22% and other vehicles in 11%. Of these accidents the motorised vehicle driver was at fault in 51% of accidents, non-motorised drivers in 37% and other causes the remaining 12%.

Detailed data were obtained for the State-owned Maharashtra State Road Transport Corporation (MSRTC) which operates bus services throughout the State in competition with privately owned and Municipal operated bus companies. MSRTC operates a fleet of 17,073 buses over 4.5M km per day and carries 7.5M passengers daily. In addition to MSRTC, the cities of Mumbai, Pune, Thane, Kolhapur and Solapur have formed public

transport sector undertakings to cater for the travel needs of their respective urban populations. Private sector buses ply long distance luxury services (contract carriage) within the State and between adjacent States. Private operators also ply buses under contract to transport industrial workers within the State.

Figure 3 illustrates the primary causes of MSRTC bus accidents for the year 1996/7 a year in which 4149 accidents [688 fatalities] occurred involving MSRTC buses.

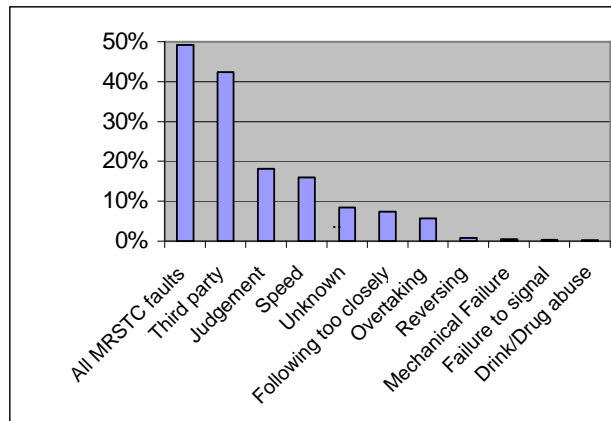


Figure 3 Primary causes of MSRTC bus accidents [1996-7]

According to MSRTC 's own investigations, their own driver was at fault in approximately 50% of accidents with stated causes comprising:

- Inaccurate judgement
- Speeding
- Following too closely
- Reckless overtaking and reversing

For the remaining 50% of accidents, other vehicle drivers were at fault in 31%, passengers 3%, pedestrians 6%, cyclists 2% and unknown causes 8%.

Fifty seven per cent of all MSRTC accidents happened on a straight road and, in 70 % of cases, the road surface was described as 'good'. Sixty nine percent of accidents occurred in daylight and 78% in fine weather. From these figures it can be seen that in the majority of accidents involving MSRTC buses it was quite likely that that there was no external, adverse factor relating to the road or driving conditions that specifically caused the accident.

Other significant statistics are that 20% of accidents occurred when passing through congested urban city centres, head-on and rear end collisions accounted for 50% of accidents and 30% involved a swipe/brush with another vehicle. The age of the vehicle is not clearly linked to accident frequency except that it is worth noting that new buses (less than 100,000kms) have a higher accident risk than those that have covered between 100-300,000kms. Very old buses (700,000kms+) have a much lower accident risk that is likely to be linked to low usage and speeds in urban congested areas.

Probable causes of bus accidents in Maharashtra

From the opinions of the various drivers, conductors traffic police and passengers interviewed throughout the State, the likely causes of bus accidents in the State comprised the following:

- Drivers and driving habits
- Vehicle condition
- Road condition
- Other factors

Clearly, the same probable causes relate to the Indian situation as they do in Nepal and for the same reasons. For instance, the transport sector is looked upon as an "employment generator" and so the result is that generally raw and untrained persons, having received little or no formal education, are employed as drivers.

Frequently, the minimum regulations for obtaining licences are not strictly implemented with touts operating outside the offices of RTO's offering licence renewal services. Many Driving Schools in the State offer training and the (guaranteed!) granting of licences to learner drivers.

Most private sector buses are repaired and maintained in roadside workshops lacking adequate infrastructure and using fake parts to minimise costs. Public sector undertakings have proper vehicle repair workshops but often these are not well equipped or maintained, thus many vehicles are operated in an unroadworthy state of repair. Surveys of bus condition implemented in Mumbai, Thane, Nasik, Pune, Satara and Kolhapur produced the results as illustrated in Figure 4.



Plate 4 Worn tyre still in use

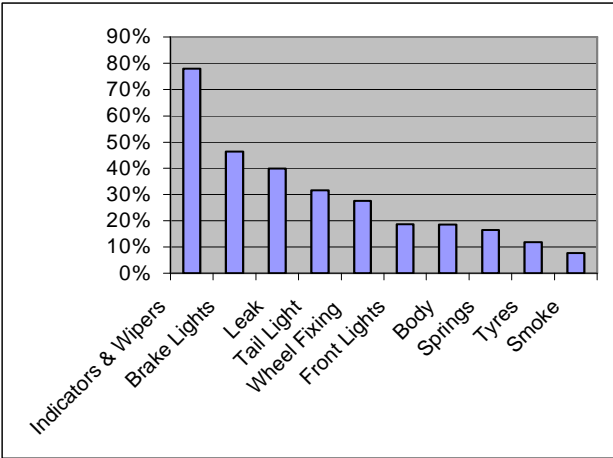


Figure 4 Faults identified in buses [India]

The high percentage of vehicles without one or both windscreen wipers is alarming especially in view of India's monsoon weather conditions. Equally alarming is the near 50% of vehicles without brake lights, a fifth with at least one front light and approximately one-third of vehicles surveyed with one rear light missing. Driving a bus on narrow badly maintained and unlit roads during the night, monsoon or thick smog without a comprehensive lighting system both at the front and rear of the vehicle is clearly dangerous. The other area of concern is that of wheels and tyres. Over a quarter of buses had one or more wheel nuts missing and tyre faults in particular were horrifying with large portions of the tyre structure exposed due to tread separation and large gashes in the walls of tyres [see plate 4].

Other related issues include road users generally being unaware of traffic rules and regulations or ignoring them when negotiating the road network. Pedestrians frequently make potentially suicidal actions leading to drivers taking avoiding action and losing control of their vehicle.

Delhi

In the era of increasing privatisation and deregulation throughout the world, the example of Delhi is important to illustrate in terms of public transport safety.

Prior to 1992 the Delhi Transport Corporation (DTC) held a monopoly of operating stage carriage services in the metropolitan region through its bus fleet. To supplement the supply it engaged private operators under its kilometrage scheme but administered and held operational control.

In 1992 the Government allowed private buses to supplement the DTC due to the latter's capital shortage which had constrained infrastructure development and fleet expansion. These were known as Red Line buses on account of their colour scheme. Individuals were granted permits rather than firms or partnerships. Permits were granted on the basis that the bus would provide individuals with a livelihood. During 1992/3 a total of 2600 permits were granted and by 1994, a total of 4000 private buses were operational and far from supplementing the DTC "they were permitted to operate in competition with the DTC" Ramasaamy and Satyaramchanderr (1998). The DTC lacked operational control of the Red Line buses and Ramasaamy and Satyaramchanderr noted that "Traffic planning structures and infrastructural facilities were not created to regulate the Red Line service operation. The State Transport Authority was left to respond on an ad hoc basis".

An article first published in the Indian newspapers and reproduced in Zimbabwe's Daily Herald was headlined "Private bus service proves to be a killer"(June 23,1993). The article suggested that residents used to give a wide berth to DTC drivers because of their reputation but the situation had worsened with the introduction of the "Red Line" buses. The drivers believed they could get away with anything e.g. "drivers speed to outrace each other, jump red lights and are heavily overloaded."

In the absence of adequate supervision of private operators, routes were cut and changed at will depending on profitability. Operators provided services without the requisite permits (which had lapsed or had not been renewed). The Indian Express suggested "there were over 2000 private buses plying on Delhi's roads without permits", January 24, 1996). Between January and July 1995 Red Line bus traffic offences totalled over 9,000 as detailed in Table 1.

Offence	Number of prosecutions	
Speeding	1512	16.4%
Reckless driving	3359	36.4%
Permit violation	407	4.3%
Use of horn	3932	42.6%
No pollution certificate	30	0.3%
Total	9240	100.0%

Table 1 Red Line prosecutions [first half of 1995]

Due to the alleged Red Line driver indiscipline, many road accidents ensued leading to injuries and fatalities. In an article in the Indian Express, it was reported that Red Line buses accounted for 0,13% of the 2,3 million vehicles operated in Delhi yet were responsible for 14% of the road fatalities in the capital (August 30, 1995). The Indian National Herald reported that Red Line buses were responsible for 220 deaths by September 1995 (October 15, 1995). Comparison of Red Line accident statistics with the DTC's own safety record is shown in Table 2.

Operator	Estimated fleet size	Total accidents	Fatal accidents	Fatalities	Injuries
Red Line	4000	511	140	151	394
DTC	2000	93	25	25	78

Table 2 Public transport stage carriage accidents in Delhi [Jan-Jun 1995]

Clearly, Red Line buses appeared to be more susceptible to accidents than DTC vehicles. Fatalities were 6 times higher and injuries 5 times greater although the Red Line fleet was probably only double that of the DTC. Ramasaamy and Satyaramchander (1998) suggested that "more than 50 % of the drivers work between 12-16 hours a day and only receive informal training". The Balakrishna Committee [1996] established following the recommendations of the Sarkaria Commission reported "It is also common knowledge that the private buses are,

more often than not, responsible for the complaints like wrong parking, overspeeding, rash driving and also for most of the traffic accidents".

Conclusions

In both India and Nepal road accidents are increasing over time. Public transport vehicles appear to be involved in a higher proportion of accidents than their numbers warrant. However, this is principally because buses cover a high annual mileage through their duty cycles. Considering the number of passengers transported a safety culture should be active and evident, however, it does not seem to be the case at the present time.

The most frequent causal features of bus accidents identified by TRL so far comprise:

- Poor driver behaviour
- Pedestrian/other road user behaviour
- Mechanical condition of bus.

The overriding factor needing to be addressed is how to improve bus driver behaviour. Possible solutions are listed below. It is evident, however, that bus drivers need to be better trained when initially learning to drive but in particular:

- Social and psychological skills, required to be a safe and responsible professional driver, should also be taught.
- Refresher driver training courses to eliminate the inevitable bad habits acquired should be encouraged.
- Awards for 'accident free' driving should be promoted.
- Medical and health checks are necessary for all, especially ageing, drivers.
- Enforcement of legal maximum hours should be given a higher priority.

These factors may increase costs but are likely to be less expensive in the longer term than the cost of human tragedy, vehicle replacement and other third party costs.

As well as improving the behaviour of the bus driver, road safety campaigns need to be funded and encouraged so that all road users are better educated as to how to behave when crossing and using the road network.

Many owners and operators need to be encouraged to maintain their vehicles to a much higher standard than at present. Preventative maintenance can improve performance and productivity and extend the operational life of the vehicle. A safe, smart bus is more likely to attract passengers than an unsafe and poorly maintained one this is especially true in a highly competitive market. Owners/operators need to understand that vehicle maintenance is a sound, effective business practice which can minimise vehicle downtime and costly, time-consuming breakdowns whilst in service.

Improvements in bus safety cannot be achieved by one individual or discipline, it is a collective responsibility and a collective spirit is required of all those involved including:

- Bus owners, drivers, conductors and mechanics
- Operator associations/unions
- Police and government transport departments
- Road safety associations and driver training schools
- Manufacturers of vehicles, spare parts and tyres
- ALL road users.

Public transport in Nepal has not undergone the same stresses of privatisation as elsewhere in the world but the existing situation does indicate some of its consequences. Ninety five percent of public transport in Nepal is private and the main control is the maximum fare structure. The deregulation of public transport services with little enforcement of residual legislation, except for maximum fares, will result (as in Nepal) in a decline in the standard of buses and drivers as operators seek to minimise costs and maximise profits. In other words a laissez faire attitude results in a drive for short-term profitability at the expense of passenger safety and comfort

The appalling loss of life due to bus accidents in Nepal is an unfortunate legacy of the lack of enforcement of existing legislation and the continued implementation of the Dial System of operating.

In India, the major organisations providing public transport services are still largely publicly owned e.g. STU's and they do attempt to try and maintain standards of safety in respect of the vehicle condition and the driver. However as was clearly illustrated by the data from MSRTC (where 50% of accidents were caused by their own driver) safety is an area which all STU's need to urgently address.

The evidence from Delhi where privately owned buses were introduced to supplement (but ultimately compete with the DTC) is not positive either in terms of enforcement or the issue of safety. Clearly, Red Line buses were not adequately supervised or monitored and as in Nepal profit maximisation became the major objective rather than providing safe, reliable and comfortable services for passengers.

Hence, whenever privatisation or deregulation is being considered in respect of the provision of public transport services, enforcement of existing (and new) legislation in terms of vehicle condition, numbers allowed to operate etc needs to be strictly enforced and operational regulations and procedures rigorously implemented to ensure public safety and service provision prevails for the benefit of passengers.

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