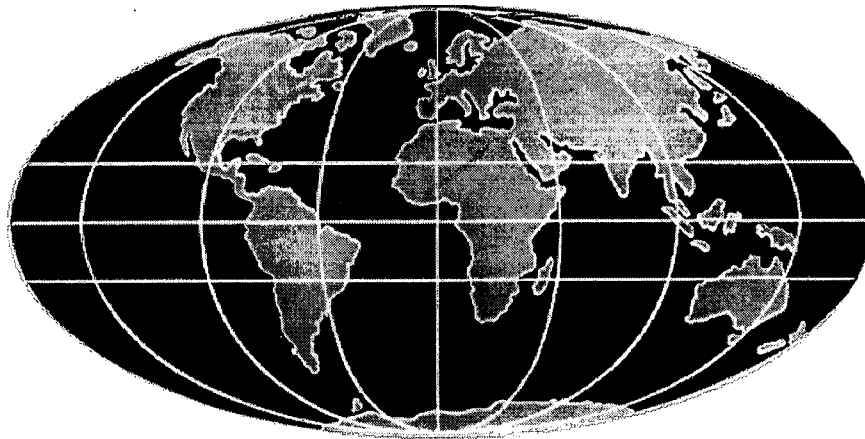


**TITLE: Bus Accidents in the
 Kingdom of Nepal:
 Attitudes and Causes**

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Bus Accidents in the Kingdom of Nepal : Attitudes and Causes

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INTRODUCTION

Bus accidents represent a significant component of all road fatalities and injuries in the Kingdom of Nepal, this paper describes the current operational environment of the bus sector in Nepal, the extent and likely causes of bus accidents makes suggestions to reduce both the number of and severity of bus accidents in the future. The paper draws on a Department for International Development (formerly Overseas Development Administration) funded study undertaken by the two authors during 1996/97.

During the period July 1995 - July 1996 a total of 479 serious bus accidents were reported to the police resulting in the deaths of 365 and 1,751 injured persons. The totals represent 39% of all road fatalities during the year and 60% of road casualties. Bus-only accidents were the most common, i.e. when the bus driver lost control and the bus left the road or overturned. Two other types of bus accidents have been identified, i.e. bus/pedestrian and bus/vehicle collisions. Approximately 75% of all bus fatalities and injuries occurred during daylight hours rather than at night.

The first passenger bus services in the Kingdom were operated from Amelekhajagung to Kathmandu in April 1957. The Nepal Transport Company and the Himalaya Bus Service soon followed. A cooperative named Sajha Yatayat was formed later to provide services in the capital and is still operational.

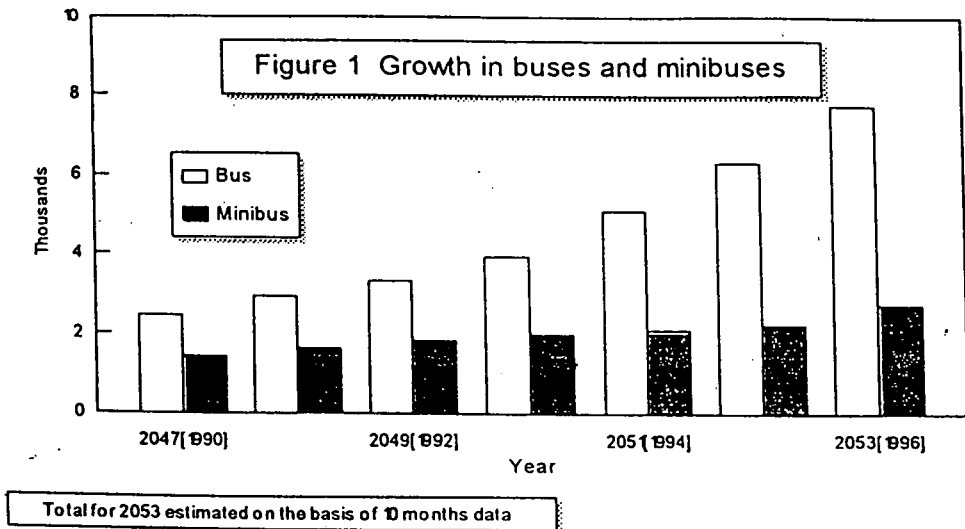
Traffic Regulations came into force during 1963 and the National Transport Management Act was enacted in 1965 which provided the

legislation to licence drivers and vehicle operators and was the forerunner to the present legislation. This 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.

In terms of providing and operating bus services in the Kingdom the aim of the Act was to ensure free and fair competition e.g. Paragraph 168 states "public vehicles shall not be given permission to operate under dial system". There has been a considerable and continuous growth in the bus sector with just under 7800 buses and 2752 minibuses estimated to be operational during 1996 (Figure 1). Passenger carrying capacity of buses ranges from 15-25 for minibuses and 40-59 for conventional buses.

About 95 percent of buses are owned and operated by the private sector, the remaining 5 percent are owned by the public or semi-public sector. Although vehicles are mainly operated on an individual basis (even small fleets will be registered in relatives' names to ensure individual registration) the "dial system" predominates as Associations or Syndicates manage routes on behalf of owners. Owners who do not belong to the Association or Syndicate that manages the route may encounter operational difficulties. The "dial system" ensures equal operational trip making for each operator in the Association 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 or 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.

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

BUS ACCIDENT STATISTICS

Table 1 illustrates serious bus accident data for the 12 month period July 16, 1995 to July 15, 1996. A serious bus accident was

defined as one in which one or more persons had been seriously injured or killed and nighttime is defined as the period between 1800 and 0600.

During the twelve month period there were a total of 479 serious bus accidents resulting in 365 persons killed and 1751 injured. All three types of accident identified in the Table are common, however, bus-only accidents in which the driver lost control and the bus left the road or overturned, are the most frequent resulting in 71% of total injuries and 63% of fatalities. Clearly such accidents are the most severe in terms of casualties and hence the causes need to be identified. Of the remaining two types of accident; bus/vehicle collisions lead to 21% of injuries and 14% of fatalities and bus/pedestrian 8% and 24% respectively thus pedestrians are very much at risk and are more likely to die than be injured if hit by a bus.

Table-1 : Serious Bus Accidents (July 1995 - July 1996)

Accident Type	No. of Accidents		No of Injured		No. of Killed	
	Total	% at night	Total	% at night	Total	% at night
Bus Only	180	25	1236	23	225	26
Bus/Vehicle	139	24	371	35	50	40
Bus Pedestrian	160	23	144	27	90	27
Total	479	24	1751	26	365	28

It might be supposed that most of the accidents would happen at night when driving conditions are likely to be more difficult but the data illustrated in the Table do not support this view. Only a quarter of all bus accidents happened at night and they appear to be no more severe than the daytime accidents in terms of fatalities and injuries.

The total number of accidents reported during the period monitored by the police amounted to 3379 so that bus accidents represent only 14% of the total reported. However for the entire year monitored by the police accident records there were a total of 925 fatalities and 2932 serious injuries throughout Nepal's road network therefore bus accidents accounted for 39% of total fatalities and 60% of injuries and involved approximately 9% of the national conventional bus fleet. Analysis shows that accidents occur on all types of road network from mountainous roads to major highways such as the Prithvi Highway.

PROBABLE CAUSES OF BUS ACCIDENTS

In order to obtain attitudes and opinions as to the likely cause of bus accidents interviews were held with bus owners/entrepreneurs, Association/Syndicate chairman and officials, drivers, helpers, passengers, insurance, Police and Government officials. Everyone interviewed gave their opinions freely and, although anecdotal, the likely causes of bus accidents can be categorised into the following groups:

- drivers and drivers' habits
- vehicle condition
- road condition
- other factors

Virtually everyone agreed that one single factor was unlikely to cause an accident and that a combination of the above were the probable causes of most serious accidents occurring on the Kingdom's highways.

Drivers and Drivers' Habits

A number of factors were raised in respect of drivers and their driving habits which are discussed in turn below:

- ease of obtaining a Commercial Vehicle licence
- lack of correct driver training
- lack of knowledge of the Highway Code and general road sense
- frequently working long hours without sufficient breaks leading to driver fatigue
- overloading vehicles in terms of passengers and goods
- night bus drivers frequently consume drugs and alcohol
- travel too fast (speeding) especially at night or for the condition of the road

At the present time in Nepal there are no Heavy Goods Vehicle Driving schools so drivers, even if they wished to learn to drive correctly, are unable to do so. Secondly, there is no provisional licence available to enable inexperienced drivers to learn to drive within the law so it appears that the Police appear to turn a "blind eye" to learners. Inexperienced bus drivers are usually assistants or helpers who appear to watch existing drivers and then practice in the bus parks and even on the road (usually at night), frequently (allegedly) with passengers on board, prior to taking the written test, attending the interview and attempting the practical driving test which is usually undertaken within a compound rather than on the road. Apart from the Police, virtually all suggested that the test for a Commercial Vehicle licence was not difficult to pass and the candidates unlikely to fail. Very few of those interviewed were even aware that a new Professional Licence had been introduced in June 1996 but it appeared to most of those interviewed that this would not make any difference to the general driving standards as new drivers would still learn by copying the "bad" habits of their mentors; i.e. today's drivers learnt from more experienced drivers at the time and so the lack of proper training and road theory is continued.

Because of the "dial system" which entails queuing and waiting in turn, most buses are said to be overloaded at certain times on the route by goods and/or passengers as drivers attempt to maximise fare revenue for themselves and the bus owner. The "dial

system⁷ 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 and chat in groups. Interviewees suggested that drivers worked excessive hours so as to make additional trips and obtain extra travel allowances from their owners. They would also be able to (unofficially) share some of the fare revenue. It was suggested that tired drivers take drugs and alcohol to keep awake and so frequently make errors and lose control of the vehicle. Restaurant and tea stalls were said to encourage drivers to stop at their stalls by incentives of free meals and alcohol again suggesting drink as a contributory cause of bad judgement or loss of control by the driver.

Finally, all, except the drivers, insisted that drivers drove too fast for the condition of the road, the load being carried and the general state of the vehicles themselves and hence could easily lose control or not be able to slow down in time should the need arise.

Condition of Vehicle

Factors discussed in relation to vehicle condition comprised:

- lack of maintenance and owners not interested in maintenance due to cost
- irrelevance of the Vehicle Fitness Test
- counterfeit parts

- worn out tyres used especially on local bus routes

All interviewees, even operators, suggested that most vehicles were in a poor state of repair and that only the night buses, which were comparatively new, were in a reasonable condition. It was perceived that maintenance was only carried out when a real need arose and that preventative maintenance was unheard of. Owners suggested that they could not afford to maintain vehicles due to a lack of profitability and that genuine spare parts were either unavailable or too costly so they tended to purchase counterfeit spares which did not last very long and could lead to dangerous consequences if the spare was a vital component such as for the braking or steering systems. The older local buses were said to be in a particular poor state of repair due to the difficulty in obtaining parts for such old vehicles and the condition of the roads on which they travelled. The state of tyres was particularly poor on local buses and this was observed on many occasions by the authors.

Although all buses have to pass a Fitness Test every 6 months most interviewees knew it was a sham and that it was simple to ensure that a Test Certificate was provided for the vehicle no matter what state the vehicle was in.

The authors undertook vehicle condition surveys within Kathmandu Valley to assess the condition and fitness of vehicles to operate. The results are shown in Table-2.

Table-2 : Results of vehicle condition surveys

Vehicle Type	Number Inspected	Vehicles with		One or more faults identified in :			
		Fitness Certificate	Pollution Sticker	Tyres	Wheel Fixings	Front Lights	Rear Lights
Long Distance Bus	18	78%	11%	39%	39%	6%	11%
Local Bus	12	92%	50%	58%	58%	0%	50%
Mini Bus	19	74%	21%	32%	47%	5%	32%
Truck & Minitruck	48	85%	19%	35%	35%	15%	35%
Taxi	32	100%	75%	22%	0%	3%	3%
Tempo	59	100%	46%	37%	2%	20%	32%
Autorickshaw	30	100%	57%	47%	0%	17%	53%
All Vehicles	218	92%	41%	37%	19%	12%	31%

The condition of the buses, in particular, gives rise to considerable concern as these are the vehicles with the potential for causing large numbers of casualties if they are involved in accidents. The fact that most of these vehicles have fitness certificates illustrates the irrelevance of the current Vehicle Fitness scheme. Each of the faults should rightly result in the vehicle being suspended from service until they were corrected. 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.

Most drivers and passengers interviewed insisted that owners were only interested in income and would spend as little as possible in maintaining the vehicle. Ironically the owners, as suggested earlier, agreed but insisted it was due to a lack of profitability. The Police who investigate accidents suggested that mechanical failure of items such as brakes, steering, springs etc. appeared to them to be very significant in many cases and this was probably due to a lack of maintenance being undertaken on a regular basis.

Road Condition

Three common factors were discussed in relation to the road network namely:

- condition of roads in general but especially up in the mountains
- road alignment
- lack of traffic signs and safety features

The first two are interrelated as generally the highways were considered to be in reasonable condition by most drivers although some considered that many sharp bends could have been better aligned for ease of motoring as even at moderate speeds, vehicles, especially heavy vehicles, tend to veer towards the other side of the highway and passengers are thrown around in buses. However, from observations, this was probably due to poor adjustment of speed and driver behaviour to the local road conditions rather than poor road alignment.

Many mountain passes were, however, considered poorly aligned and in very poor

condition, especially at the end of the monsoon period. However the physical conditions constrain the alignment in most cases so it is probable that most respondents were discussing the general poor condition (in part) of the mountain roads and general lack of safety features such as barriers and speed calming measures. Landslides occur and are not quickly cleared and on many sections the drivers and owners suggested that the roads were frequently too bad to operate buses on although bus services continued. Thus, tyres would puncture, mechanical failures (such as springs) could occur, especially where welding repairs have already taken place, and steering was often difficult along potholed and badly rutted roads. Owners suggested that they could not afford to operate other than old and ill maintained buses on such roads which as a consequence are some of the most dangerous to travel on as a bus passenger in Nepal.

Virtually all respondents said that there were not enough road signs to inform drivers of speed limitations, impending dangers or road conditions ahead. Many drivers suggested accidents occurred because of a lack of knowledge of the road condition or its alignment ahead of them. However, this is surprising given that drivers are frequently driving the roads and should be aware of potential hazards and problems.

Other Factors

Issues not related to the above but thought as possible factors in bus accidents include:

- poor traffic awareness by all road users
- lack of bus bays on the roadside
- parking at tea stalls on the highway
- domestic animals
- weak enforcement of traffic regulations

It was considered that all road users, both motorists and pedestrians, have poor road or traffic sense. Pedestrians came in for severe criticism, especially in rural areas, as they cross the road without looking or concern for vehicles and assume that vehicles would stop for them without appreciating the problems of trying to stop suddenly. Also, they would not move from

the road unless the driver 'honked' his horn. The control of animals was also a concern to drivers as the priority was to avoid hitting animals such as cows, goats, ducks, dogs, etc on the road or roadside for fear of having to pay compensation. However, animals are often found on the road, crossing haphazardly for grazing purposes and not well herded, etc. Animals were considered a dangerous hazard and probable cause of accidents as drivers attempt to avoid both them and pedestrians.

Generally the lack of proper bus bays on roadsides was considered a hazard as buses block roads while passengers board or alight and passengers frequently step into the road without waiting for vehicles to pass by (linking back to a lack of road sense). At night buses park outside tea stalls during rest periods usually without lights and on the road itself, causing potential danger to other traffic. As might be expected drivers did not consider this a potential accident cause.

Enforcement of existing traffic regulations as prescribed in the Vehicle and Transport Management Act does appear to be weak, especially in rural areas and along major highways, due to a lack of police highway patrols. Checkpoints are manned at certain locations in the road network and a certain level of enforcement is undertaken but not stringently enough to discourage drivers and operators from flouting the regulations.

SUGGESTIONS FOR REDUCING BUS ACCIDENTS

There is little doubt from the surveys and observations of road conditions, road use by all users including pedestrians, bus condition, driver behaviour, potential fatigue and physical condition of older drivers, owners' attitudes and lack of responsibility (other than to minimise costs and maximise revenue) that all have a potential causal role to play when a severe bus accident occurs. The specific cause of each accident may be impossible to ascertain unless the driver survives to testify truthfully and any suspect mechanical or tyre part(s) survive for examination purposes.

It is clear from the findings that bold initiatives are therefore required to reduce the

catastrophic loss of life and minimise the suffering of both casualties and relatives of the dead and injured.

All major accidents are currently investigated by the local Police or by the Valley Traffic Police in the Kathmandu Valley. It is suggested that a multi-disciplinary Accident Investigation Unit is created. The Unit would be charged with investigating all multiple fatality accidents that involve buses; it could also create a detailed data base leading to a much better understanding of the causes of bus accidents.

In many countries throughout the developing world, cash incentives are given by managers and owners of buses to drivers who have accident free records during the year. Such incentives can be as much as 1 to 2 months pay so can be quite an incentive to drivers but also ensure that they drive in a safe manner so as to preserve their record. Owners benefit by not having vehicles out of service for long periods due to accident repairs and save on insurance premiums. It is suggested that Owners and Associations/Syndicates could pursue such a scheme with their driver employees.

Chapter 10 of the 1992 Act specifies the arrangement for penalties and clause 164 identifies traffic related offences related to driving a vehicle. These need to be strictly enforced in relation to bus drivers and the fines increased substantially to act as a real deterrent especially in respect of drinking and driving and other related traffic offences. The removal or suspension of commercial driving licences needs to be considered for frequent offenders. The incidence of overloading buses in terms of passengers and goods needs to be curtailed as this is a specific safety issue.

The Police Highway Patrols need to be increased so that the patrols are much more evident than at present. There is no question that the presence of police patrols ensure better driving standards, at least in the presence of the patrols, and might curtail the commonly perceived belief that bus drivers generally drive too fast.

Owners need to be encouraged to maintain their vehicles in a better state than at present as this will extend the effective operational life of

the bus and ensure that the vehicles meet Vehicle Fitness standards. Owners need to understand that vehicle maintenance is a sound, effective business practice as it can assist in minimising vehicle downtime and costly, time consuming breakdowns whilst in service. Mechanics need to be better trained in mechanical engineering practices and drivers should have some appreciation of mechanical parts especially the more important systems such as brakes, steering, clutch, tyres etc so that they appreciate the risks they are taking when operating an unfit vehicle.

The existing Fitness Test for buses appears flawed with many vehicles quite clearly in an ill-maintained state yet operating and providing passenger services on some of the Kingdom's most dangerous roads. A strong commitment to implement the Fitness Test more rigorously needs to be established with only vehicles meeting the minimum safety standards allowed to provide passenger carrying services. Roadside police checks should be encouraged to monitor vehicle condition.

Rehabilitation of the existing Kingdom's road network is obviously a priority and wherever the need can be identified from monitoring accident locations and frequencies the rehabilitated road sectors should include safety features such as:

- safety barriers
- traffic calming measures
- pedestrian crossings
- visual chevrons warning of dangers
- sufficient traffic signs

The need for realigning the course of the existing roadway may also be required where it can be identified that the existing alignment is contributing to accidents and physical obstacles are not insurmountable.

The provision of off-road bus bays should also be incorporated when rehabilitating road schemes thereby ensuring that bus passengers can board and alight from buses "off the road" and thus in safety.

The scope of maintenance needs to be improved throughout the road network but especially in the mountainous regions of the Kingdom so that road conditions are suitable for

bus operators to be encouraged to operate their buses and continue to provide socially desirable bus services in such areas. The need for improved traffic signing and road marking is critical at many locations and the standard markedly varies depending on area or zone of the Kingdom. Standards of road signing need to be universally implemented throughout the entire road network.

Adequate off-road parking should be provided in front, or nearby, roadside tea stalls so that buses (especially at night) can park in safety and not be a hazard for other traffic.

Despite organising road safety campaigns on an ad hoc basis as and when funding allows, the need to educate **all** users of the road but especially **pedestrians in rural areas** on traffic awareness and the Highway Code is essential to minimise the considerable number of bus/pedestrian accidents. Such campaigns need to be undertaken regularly throughout schools using, where appropriate, all media including press, radio, television and cinema. All road users would then understand their own responsibilities in terms of using/crossing the road.

Included in any road safety campaign is the need for stressing the importance of restraining animals from wandering on the roadside. Animal hazards require drivers to take evasive action to avoid collisions and loss of control is a distinct possibility in such situations. Improved animal herding would be safer for the animals, the animal herdsman, as well as vehicles and passengers travelling along the highways and rural road network.

Finally, 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, mechanics and conductors
- Operator Associations and Syndicates
- Police
- Government Departments
- Vehicle, spare part and tyre manufacturers
- All road users.

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