1. ROAD SAFETY PROBLEMS IN DEVELOPING COUNTRIES

1.1 Scale and Nature of the Problem

It has been estimated that over 300,000 persons die and 10-15 million persons are injured every single year in road accidents throughout the world. Detailed analyses of global accident statistics by the UK Transport Research Laboratory (TRL) and others indicate that fatality rates per licensed vehicle in developing countries are very high in comparison with the industrialised countries. Fatality rates (with respect to vehicle numbers) in the developing world, particularly in African countries, can often be 20 to 30 times as high as those in European countries (Figure 1.01).

Furthermore, whereas the situation in most industrialised countries appears to be improving (in terms of actual numbers of persons killed as well as the accident rates), many developing countries have, in recent years, faced a worsening situation. An indication of the growth of road accident deaths in developing countries can be seen from Figure 1.02 which shows the percentage change in deaths over the 17 year period 1968-1985 in a number of African and Asian countries and also a group of developed countries. Between 1968 and 1985 the number of deaths increased by over 300% in African countries and by over 170% in Asian countries.
countries. Conversely, in the developed countries over the same period, the number of persons killed actually declined by 25%.

Road accidents have been shown to cost around one per cent of these countries' annual gross national product (GNP) - resources which they can ill afford to lose. Since, in many cases, replacement vehicle parts, medicines and hospital equipment all have to be imported to such countries, these losses to the economy can often include a significant foreign exchange element.

Studies by the TRL Overseas Unit in collaboration with the World Health Organisation also show that road accidents rank surprisingly high as a cause of death in developing countries. For the 5-44 year age group, road accidents are commonly the second highest cause of early death. Improving health care and gradual reductions in the traditional infectious diseases have resulted in road accidents becoming increasingly more important as a cause of death and they now represent a growing public health problem in the developing world.

The nature of the problem in developing countries is, in many instances, very different from that found in industrialised countries. For example, the proportions of commercial and public service vehicles involved are often much greater. In Indian cities buses are involved in around 25 per cent of all injury accidents while the equivalent figure for Britain is under four per cent. Commercial vehicle occupants in Kenya contribute to 16 per cent of all road accident casualties while the equivalent figure for most developed countries is under five per cent. Pedestrians, cyclists and slow-moving vehicles are often not well catered for and pedestrians, in particular, are often exposed to unnecessary dangers. Not surprisingly, they often constitute the road user group appearing most frequently amongst those injured and killed in road accidents.

![Percentage change in road accident fatalities in Asia, Africa and Europe, 1965-85](image)

*Fig 1.02*

*Percentage change in road accident fatalities in Asia, Africa and developed countries 1968-85*
1.2 Road Safety and Highway Design Practices in Developing Countries

Growth in urbanisation and in the numbers of vehicles in many developing countries has led to increased traffic congestion in urban centres and increases in traffic accidents on road networks which were never designed for the volumes and types of traffic which they are now required to carry. In addition, unplanned urban growth has led to incompatible land-uses, with high levels of pedestrian/vehicle conflicts. The drift from rural areas to urban centres often results in large numbers of new urban residents unused to such high traffic levels. As a result, there has often been a severe deterioration in driving conditions and a significant increase in the hazards to and competition between different classes of road users of the road system. In addition, the inherent dangers have often been made worse by poor road maintenance, badly designed intersections and inadequate provision for pedestrians. All of these have contributed to the serious road safety problems now commonly found in developing countries.

Highway design standards in many developing countries tend to be either outdated (often dating to colonial times) and no longer relevant, or else simply too direct a translation from overseas without appropriate modification for the particular needs of the developing country. The standards usually ignore pedestrians, other non-motorised traffic and motor cycles. Unfortunately, such standards may often be too high, costly or require excessive maintenance for the countries to afford. In such circumstances, the emphasis tends to focus upon the constructional rather than the operational aspects. Engineers will typically concentrate on construction details of drainage, for example, rather than on how the type of drainage channel chosen may affect road safety. Important operational elements such as road signs or pedestrian facilities are too often left for later addition “if and when time or money permits”, while the builders move on to the next construction project. It is rare for the additional time and money ever to be found. As a result, road designs which would be safe in the operational environment of industrialised countries often become unsafe under the operational conditions which exist in developing countries. Little effort is made to modify designs or to add additional features to compensate for the operational deficiencies likely to occur in the developing world. Few efforts are made to quantify potential problems which are specific to developing countries. This is exemplified by the fact that the authors know of no major rural highway project in a developing country in which actual or potential pedestrian flows along the route have ever been formally surveyed - yet it is well known that in many developing countries such pedestrian flows can often be very high as the roadway also becomes the main footpath linking communities.

Even where such elements have been included, the shortages of trained professionals and the limited resources devoted to maintenance organisations often means that overgrown footpaths and damaged traffic control facilities such as road signs and traffic signals are often left unrepaird. Efforts should therefore be made from the planning stage to use solutions which require minimal maintenance (e.g. roundabouts instead of traffic signals). More generally the institutional developments necessary to ensure maintenance capability have usually not kept pace with road building. The result is that roads are often badly in need of maintenance, traffic signing is often inadequate, facilities for pedestrians are poor and guidance to drivers via channelisation or other control measures is rarely available. These general deficiencies in the operational and control aspects of the road systems are made worse by the fact that drivers are rarely adequately trained and tested, traffic law enforcement is ineffective and drivers’ behaviour in respect of compliance with regulations is frequently very poor. The net result of these inadequacies is the very high incidence of road accident casualties and fatalities.
1.3 Lessons to be Learned from more industrialised Countries

The OECD countries (which includes all of the most industrialised countries) have achieved considerable success in tackling their road safety problems over the last 25-30 years. Although improvements were achieved through the application of road accident countermeasures in various sectors, one of the most consistently successful and cost-effective areas of investment has been the field of road planning and traffic engineering. Gradual elimination of the most hazardous locations on road networks and the adoption of safety-conscious approaches to the design and planning of new road networks have contributed greatly towards improving traffic safety. Even though the eventual solutions may differ, the approaches and systematic methods used in industrialised countries are readily applicable to the developing world.

In some respects developing countries are fortunate in that their road networks are usually still at an early stage of development. They also have the added advantage of being able to draw upon the experience of the developed countries which have already passed through similar stages of development, albeit more slowly. Adoption of proven strategies from industrialised countries (such as ‘accident blackspot elimination and more safety-conscious design and planning of road networks) offer unparalleled opportunities to make significant and lasting improvements to road safety. They should be given urgent consideration by responsible authorities. Sadly, many developing countries continue to repeat the mistakes of the industrialised countries, e.g. many still permit linear development with direct access from frontage properties along major roads even though this is known to lead to safety problems.

One thing that all industrialised countries have found to be of crucial importance in their efforts to improve safety is the availability of good, accurate and comprehensive accident data, so that the problem can be properly defined and suitable remedial measures devised. Consequently, before developing countries can emulate industrialised countries it is essential that good accident data systems are established.

In order to maximise the impact which engineering can have upon safety problems, it is necessary to apply measures at various stages in the development of road networks. By incorporating good design principles from the start it is possible to avoid many problems simply by planning and designing new roads in a safety-conscious manner. Even where this has not been done, it may still be possible (although more expensive) to improve existing roads by subsequent introduction of safety or environment-related measures, e.g. selective road closures or road humps to reduce speeds, or by prohibitions on heavy goods vehicles in residential areas.

Finally, it is possible to identify hazardous sections of the road network so that appropriate remedial measures can be undertaken to reduce the likelihood and severity of accidents at those locations. This has proven to be one of the most cost-effective ways of improving road safety in industrialised countries.

These methods offer scope to improve safety through their influence on driver behaviour, traffic speeds, route choices and so on. These approaches are discussed in depth in later sections of this document. However, there may be valid reasons (such as behavioural and traffic type differences) why methods which are proven to work well in industrialised countries may be less effective in a developing nation. Thus the need for evaluative research is stressed whenever new methods are introduced (see Section 6.5).