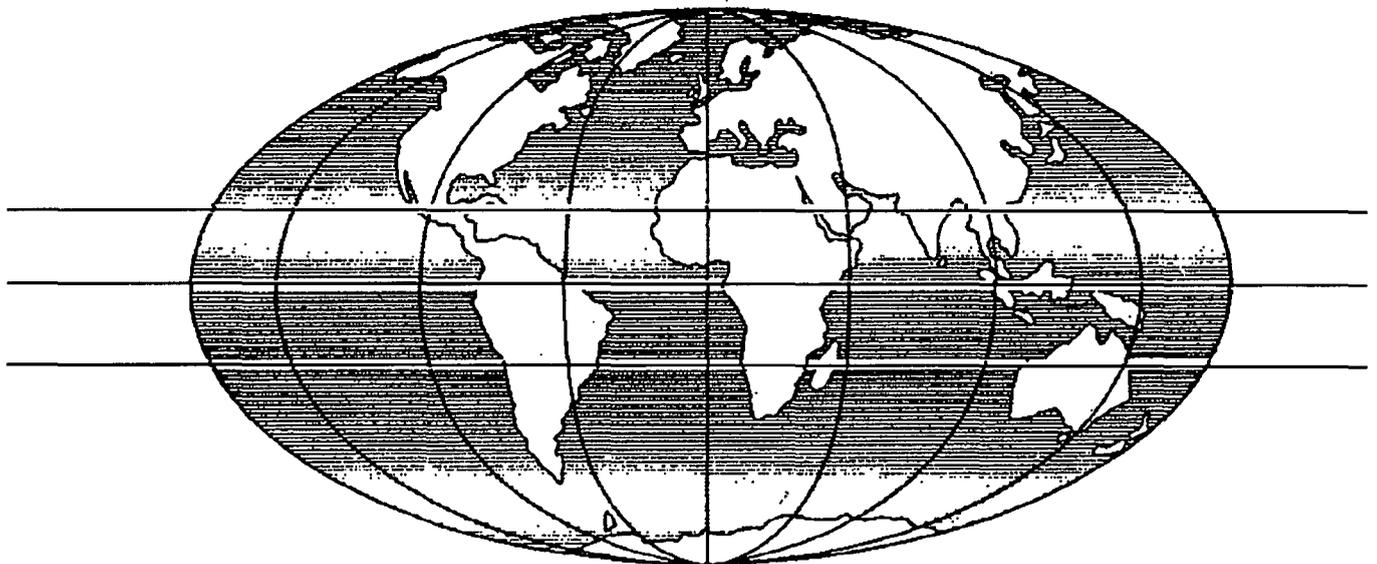




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**TITLE Safety problems in developing countries**

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**SAFETY PROBLEMS IN DEVELOPING COUNTRIES**

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**I. THE GLOBAL SCENE**

Earlier studies by both the World Bank and the World Health Organisation indicated that there are around 500,000 road accident fatalities taking place each year throughout the world and about 15 million people injured. These studies also indicated that about 60 per cent of these deaths and injuries take place in those countries of Africa, Asia and Latin America classified by the World Bank as low or middle income. (1)(2).

A recent study undertaken for the British Overseas Development Administration (ODA) by a joint Ross Silcock and TRL team, also indicated an annual total of 500,000 road accident deaths taking place worldwide but in this study over 70 per cent of deaths occurred in the developing countries. This suggests that although there has been little change worldwide in the last ten years or so in the total number of road accident deaths, the proportion in the developing world has risen considerably.

As well as the social and humanitarian costs such as pain, grief and suffering that arise as a result of road accidents, there are also economic costs to consider. Jacobs and Fouracre (3) calculated that for any country, be it developed or developing, the annual cost of road accidents is equivalent to approximately one per cent of its gross national product (GNP). The recent Ross Silcock/TRL study (see above) also showed, using this estimate of accident costs, that globally road accidents may well be costing about US\$ 230 billion per year, with the cost in developing countries being about US\$ 36 billion. Thus apart from the humanitarian aspect of the problem, road accidents cost developing countries large sums of money each year that they can ill afford to lose.

**II. RATES AND TRENDS**

One convenient method that can be used to compare the seriousness of the road accident problem in different countries throughout the world is to use the number of road accident deaths per annum per 10,000 vehicles licensed. This is far from ideal; for example the injury accidents per million vehicle - km travelled per annum may be a better parameter to use but the reporting of non-fatal accidents in most developing countries is poor and little information is available on annual travel by different classes of vehicle.

Results from a number of countries (mainly 1993) are shown in Figure II.1. It can be seen that whereas countries of the developed world are characterised by a death rate of often less than 2, some developing countries have rates in excess of 100. Rates in African and Asian countries could, in fact, be higher than Figure II.1 suggests in that even road accident deaths are under-reported and scrapped vehicles tend not to be removed from the vehicle register.

Figure II.1  
ROAD ACCIDENT FATALITY RATES ( DEATHS/10,000 REGISTERED VEHICLES) IN SELECTED COUNTRIES (FROM LATEST DATA AVAILABLE FROM 1989-1993)

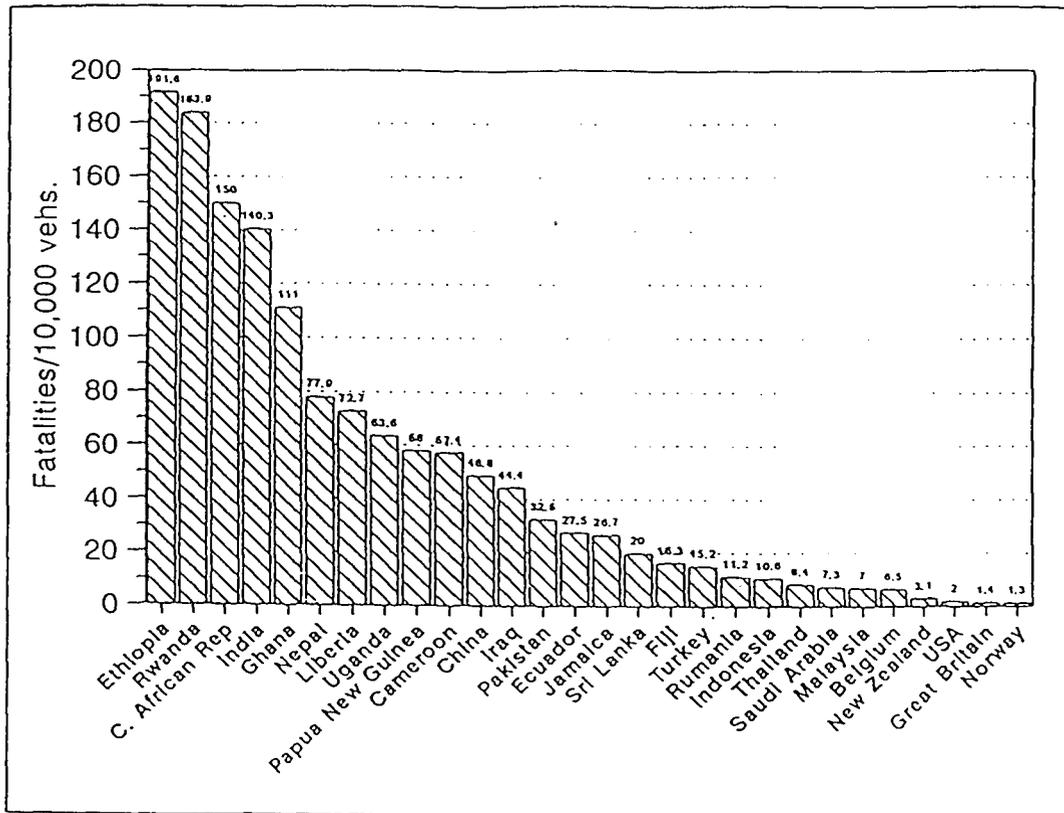
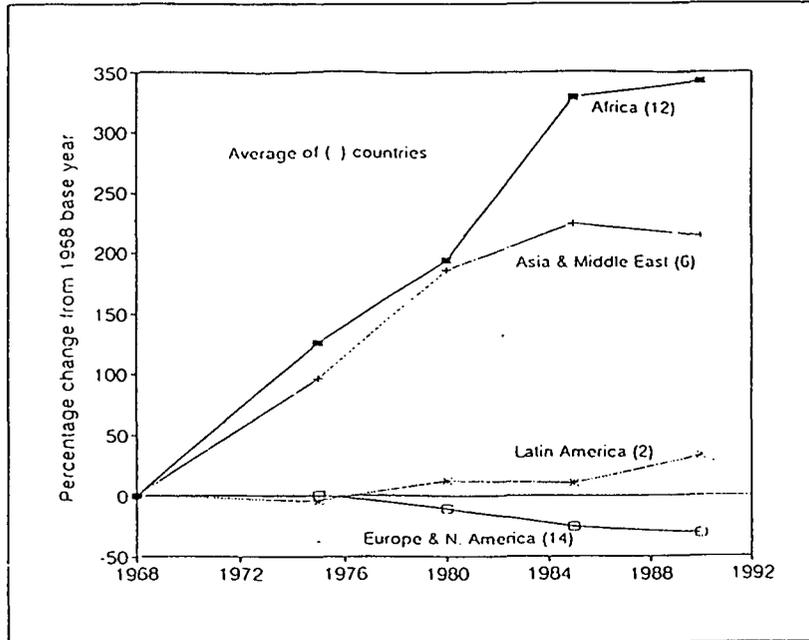


Figure II.2 shows the percentage increase or decrease in the number of road accident deaths over the period 1968 to 1990, (i.e. 1968 is used as the base year), for different regions of the world. Over the period shown, the number of deaths in the 14 developed countries actually fell on average by 30 per cent (this despite the large increase in vehicles on the roads of Europe and North America). Conversely in six Asian and Middle Eastern countries and 12 African countries (where reasonably accurate statistics were available), there were increases of about 200 and 340 per cent respectively.

In these countries there is obviously a need for greater effort and investment in road safety in order to reverse this trend. For example in Great Britain, expenditure on road safety has been particularly effective in recent years. Thus between 1965 and 1994, road accident fatalities fell by over 50 per cent whilst over the same time period the number of licensed vehicles almost doubled.

Figure II.2  
 PERCENTAGE CHANGE IN ROAD ACCIDENT FATALITIES OVER 22-YEAR PERIOD



### III. THE NATURE OF THE ACCIDENT PROBLEM

#### III.1 ACCIDENT PATTERNS

There are a number of accident characteristics which are common to a number of developing countries and yet are somewhat different from those in developed countries. In any country it is inevitable that a significant proportion of persons killed and injured will be pedestrians, obviously the most vulnerable group of road users. However, statistics (see Figure III.1) show that the percentage of all persons killed, who are pedestrian is particularly high in Middle Eastern, Asian and African countries.

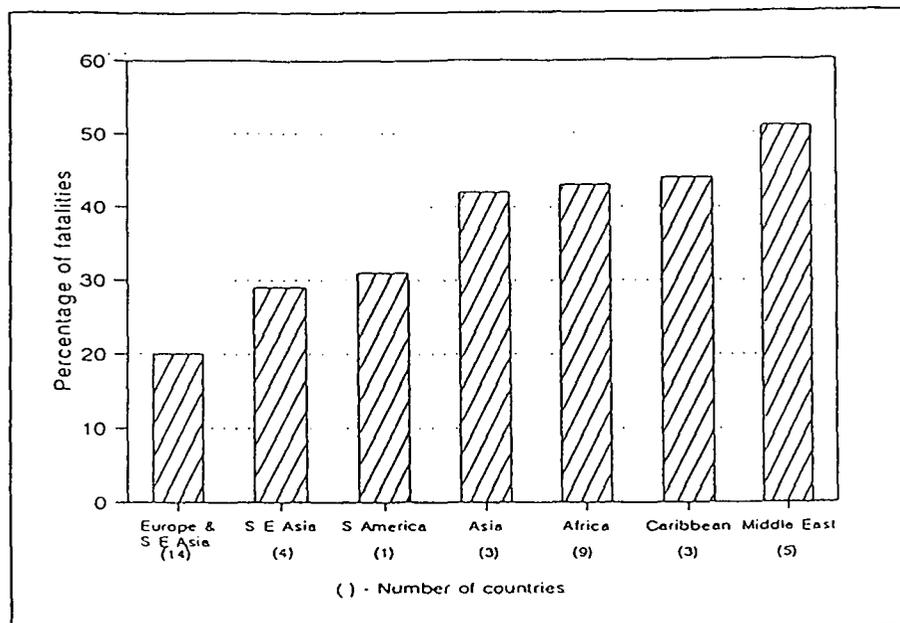
A significant proportion of those pedestrians are in fact young people. Thus a recent study has shown that whereas in developed countries the percentage of all people killed who are aged under 15 is less than 6 per cent, the equivalent figure in developing countries was over 15 per cent. This is obviously due, in part to differences in the age profiles of the total population between developed and developing countries but other important factors are also at play. For example, few African and Asian countries provide instruction in road safety education and proportionately more children walk to school as opposed to being driven. These factors together with the development of materials that can be used by primary school teachers in Africa are currently the subject of detailed research by TRL.

As might be expected, the types of accident taking place and the vehicles involved depend considerably on local conditions. For example in Papua New Guinea, pick-up trucks are the most common form of public transport and in that country almost 40 per cent of all fatal accidents involve a pick-up. Accidents involving public service vehicles i.e. buses or their equivalent are much more common throughout Asia than for

example in Western Europe. Thus in Great Britain only 3 per cent of all accidents involve a bus. Conversely in Pakistan, India and Sri Lanka the equivalent figure is about six to eight times higher.

Economic growth in virtually all countries is accompanied by increasing vehicle ownership. In countries such as Malaysia and Indonesia much of this growth is in terms of increased motorcycles. (Used perhaps as a stage towards the ownership of a car). Consequently a very high percentage of persons killed and injured are users of motorcycles, scooters and mopeds. Thus in Malaysia, over 60 per cent of all road accident casualties are users of motorcycles (or equivalent) and a detailed study of road accidents in Bandung, Indonesia showed almost 50 per cent of all casualties to be motorcycle users.

Figure III.1  
PEDESTRIAN FATALITIES AS A PERCENTAGE OF ALL ROAD ACCIDENT FATALITIES



### III.2 FACTORS INVOLVED

In most countries accidents involving personal injury are reported by (or to) the police and their accident reports provide information on the factor or causes which contribute to the accident. In general the police are primarily concerned with traffic violation and their reports usually under-estimate the importance of road layout and design or vehicle condition. The emphasis of police investigations therefore will tend to be on determining human error and apportioning blame.

In the UK, detailed study was undertaken by TRL in the 1970's of injury accidents taking place in an area of South East England (4). This study showed the importance of the road user which was a factor in 95 per cent of accidents investigated. The study also demonstrated the strong link between road user error and deficiencies in the road environment which together contributed to over 25 per cent of accidents.

Constraints of funding have prevented TRL carrying out a similar study in Africa or Asia so police reports have been the only source of information, see table III.1.

Table III.1  
CAUSES OF ROAD ACCIDENTS AS DETERMINED BY THE POLICE IN DEVELOPING COUNTRIES

Country	Main Causes of Accident %			
	Road-user error	Vehicle defect	Adverse road conditions or environment	Other
Afghanistan 1984	74	17	9	-
Botswana 1982	94	2	1	3
Cyprus 1982	94	1	5	-
Ethiopia 1982	81	5	-	14
India 1980	80	7	1	12
Iran 1984	64	16	20	-
Pakistan 1984	91	4	5	-
Philippines 1984	85	8	7	-
Malaysia 1985	87	2	4	7
Zimbabwe 1979	89	5	1	5
TRL On-the-spot study 1975	95	8	28	

From this table it can be seen that, in general the data highlights the importance of the road user in accidents in developing countries but gives little indication of any road environment factor other than in the case of Iran. It seems likely that the road environment (in terms of road layout, design and surface condition) has been under-estimated by the police as a factor on accidents. The condition of main roads is poorer in developing countries than in developed (see (5) for example) and the pace of introducing effective engineering improvements to reduce accidents is much slower in the developing world. By speeding up this process the inevitable rise in accidents in many Asian and African countries could certainly be slowed down. The best way to go about this is currently the subject of detailed research by the Overseas Centre at TRL.

### III.3. ROAD USER BEHAVIOUR AND KNOWLEDGE

Studies undertaken by TRL of road user behaviour in a number of developing countries clearly showed that road users were much less disciplined than in the UK (6)(7). Although the relationship between differences in behaviour and accidents was not determined (not being the objective of these particular studies), the results suggest that road safety measures that are not self-enforcing (such as road signs and markings), may be much less effective unless they are integrated with publicity and enforcement campaigns. Poor driver behaviour in some countries may be due to their lack of knowledge about road safety regulations or to their general attitude towards driving. Studies by TRL indicated that there were only a few topics where a lack of knowledge was widespread. Although attitudes are notoriously difficult to change there would seem to be potential for improvement by introducing publicity and enforcement campaigns.

Another area of concern in many, but not all, developing countries is the problem of alcohol and road users. Ongoing research at TRL has indicated from roadside random breath test surveys that in one country the proportion of weekend drivers sampled at night with over 80mg of alcohol/100ml of blood in their bodies was more than ten times that found in the UK.

#### IV. SUMMARY

Road accidents continue to be an important social and economic problem in developing countries. Fatality rates are high in comparison with developed countries and the actual number of deaths in Africa and Asia show large increases over the last twenty years. Conversely deaths from road accidents in Europe and North America have declined by about 30 per cent despite large increases in vehicles on the roads of these countries.

Relatively little can be done to deal with the safety problem in any country until the problem has been clearly defined in terms of factors involved, types of accident taking place, class of road user injured and the location of accidents. In order to assist developing countries improve their accident databases and their accident investigation and diagnosis capability, TRL's Overseas Centre with ODA's support has developed its Micro Computer Accident Analysis Package (MAAP). This consists of a number of alternative forms or booklets to be used by the police to collect data nationally and systematically and a set of software programmes for data entry and analysis. The relatively low cost and availability of micro computers means that countries (or provinces, regions, police districts or cities within countries) can analyse their own data to help identify accident locations and the nature of the problem. In this way appropriate countermeasures can be introduced, their effectiveness assessed, all with increased efficiency and therefore it is hoped, accuracy.

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