Urban Road Safety
Module 5b
Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities
OVERVIEW OF THE SOURCEBOOK

Sustainable Transport:
A Sourcebook for Policy-Makers in Developing Cities

What is the Sourcebook?
This Sourcebook on Sustainable Urban Transport addresses the key areas of a sustainable transport policy framework for a developing city. The Sourcebook consists of more than 30 modules mentioned on the following pages. It is also complemented by a series of training documents and other material available from http://www.sutp.org (and http://www.sutp.cn for Chinese users).

Who is it for?
The Sourcebook is intended for policy-makers in developing cities, and their advisors. This target audience is reflected in the content, which provides policy tools appropriate for application in a range of developing cities. The academic sector (e.g., universities) has also benefited from this material.

How is it supposed to be used?
The Sourcebook can be used in a number of ways. If printed, it should be kept in one location, and the different modules provided to officials involved in urban transport. The Sourcebook can be easily adapted to fit a formal short course training event, or can serve as a guide for developing a curriculum or other training program in the area of urban transport. GTZ has and is still further elaborating training packages for selected modules, all available since October 2004 from http://www.sutp.org or http://www.sutp.cn.

What are some of the key features?
The key features of the Sourcebook include:
- A practical orientation, focusing on best practices in planning and regulation and, where possible, successful experiences in developing cities.
- Contributors are leading experts in their fields.
- An attractive and easy-to-read, colour layout.
- Non-technical language (to the extent possible), with technical terms explained.
- Updates via the Internet.

How do I get a copy?
Electronic versions (pdf) of the modules are available at http://www.sutp.org or http://www.sutp.cn. Due to the updating of all modules print versions of the English language edition are no longer available. A print version of the first 20 modules in Chinese language is sold throughout China by Communication Press and a compilation of selected modules is being sold by McMillan, India, in South Asia. Any questions regarding the use of the modules can be directed to sutp@sutp.org or transport@gtz.de.

Comments or feedback?
We would welcome any of your comments or suggestions, on any aspect of the Sourcebook, by e-mail to sutp@sutp.org and transport@gtz.de, or by surface mail to:
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Further modules and resources
Further modules are under preparation in the areas of Energy Efficiency for Urban Transport. Additional resources are being developed, and Urban Transport Photo CD-ROMs and DVD are available (some photos have been uploaded in http://www.sutp.org – photo section). You will also find relevant links, bibliographical references and more than 400 documents and presentations under http://www.sutp.org, (http://www.sutp.cn for Chinese users).
Modules and contributors

(i) Sourcebook Overview and Cross-cutting Issues of Urban Transport (GTZ)

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1c. Private Sector Participation in Urban Transport Infrastructure Provision (Christopher Zegras, MIT)
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1e. Raising Public Awareness about Sustainable Urban Transport (Karl Fjellstrom, Carlos F. Pardo, GTZ)
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2a. Land Use Planning and Urban Transport (Rudolf Petersen, Wuppertal Institute)
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3b. Bus Rapid Transit (Lloyd Wright, ITDP)
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3e. Car-Free Development (Lloyd Wright, ITDP)

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4b. Inspection & Maintenance and Roadworthiness (Reinhard Kolke, UBA)
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4e. Intelligent Transport Systems (Phil Sayeg, TRA; Phil Charles, University of Queensland)
4f. EcoDriving (VTL; Manfred Breithaupt, Oliver Eberz, GTZ)

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5a. Air Quality Management (Dietrich Schwela, World Health Organization)
5b. Urban Road Safety (John Fletcher, TRL; Jacqueline Lacroix, DVR; David Silcock, GRSP)
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5f. Adapting Urban Transport to Climate Change (Urda Eichhorst, Wuppertal Institute)

Resources
6. Resources for Policy-makers (GTZ)

Social and cross-cutting issues on urban transport
7a. Gender and Urban Transport: Smart and Affordable (Mika Kunieda; Aimée Gauthier)
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The German Road Safety Council (DVR) was founded in 1969 as a non-profit organisation. The objective of the organisation is to support measures aimed at improving the traffic safety of all road users. The main emphasis is given to issues related to engineering, education, legislation and enforcement. DVR coordinates the different activities of its members, develops programs and adapts them to new challenges and research findings.

The Global Road Safety Partnership (GRSP) is an informal network of businesses, civil society organisations and relevant government departments. GRSP members have been identifying ways in which they can act together to improve road safety globally. The International Federation of Red Cross and Red Crescent Societies host the GRSP Secretariat at its headquarters in Geneva, Switzerland. GRSP aims to find more effective and innovative ways of dealing with road safety in developing and transition countries. Through a comprehensive approach to road safety, GRSP partners collaborate and coordinate road safety activities. This approach aims to build the capacities of local institutions and enhance the ability of professionals and communities proactively to tackle safety problems.
Module 5b
Urban Road Safety

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1. Introduction

Rapid urbanisation in developing countries presents tremendous challenges to the transport systems of expanding cities if they are to meet the access and mobility needs of their communities and provide them with a sustainable, safe and healthy environment. It is estimated that urban populations in developing countries are currently growing at around 4% per annum and that by 2045, more than a half of the populations of the poorest nations will live in cities (UNDESA 2010). To meet this expansion, many developing world cities are increasing the capacity of their road networks, but often at the expense of the safety of the vulnerable road users.

As a result many people die and are injured unnecessarily in road crashes with the consequential social economic and health burdens imposing heavy constraints on sustainable development.

In 2004 around 1.3 million people died around the world as a consequence of road crashes and about 24 million persons were injured in these incidents seriously enough to require medical attention (WHO 2008). More than 90% of road deaths occur in low- and middle-income countries, where the death rates (21.5 and 19.5 per 100 000 population, respectively) are double those for high-income countries (WHO 2009). This is despite the fact that these countries have only around 48% of the world’s registered vehicle fleet (see Figure 1).

As Figure 2 illustrates the much higher fatality rate per vehicle in Low and Middle Income Countries (LMICs). Because vehicle ownership and the density of roads can be very much higher in urban areas rather than in rural areas in poorer countries, the road safety problem tends to be focused in built-up areas.
Figure 2
People killed in road crashes per 10,000 vehicles.
Figures for 2007 from WHO 2009
The majority of road crash victims in developing countries are not motor vehicle occupants, but pedestrians, motorcyclists, bicyclists and non-motorised vehicle occupants. Poor driving, poor vehicle standards and overloading of unrestrained passengers also make buses and taxis very dangerous in LMICs, frequently resulting in multiple fatalities or injuries in one crash. As the poor are most likely to use the roads as pedestrians, bicyclists, motorcyclists, or as users of public transport, they are greatly over represented in, and affected by, road crashes.

Road deaths were ranked ninth as a cause of disability adjusted years of life lost in 2004, and are expected to be ranked fifth by the year 2020 (WHO 2008). Increasingly road crashes reduce social welfare (see Box 1). The economic cost of road traffic crashes globally has been estimated at US$ 518 billion. Road traffic crashes cost most countries between 1–2% of their gross national product, although this can reach up to 5% (for example, in the cases of Malawi and Vietnam). Road injury is the leading cause of death for 15 to 29 years olds and also the second major cause for 5 to 14 year olds (WHO 2010).

“In developing countries the situation (road safety) is made worse by rapid and unplanned urbanisation. The absence of adequate infrastructure in our cities, together with the lack of a legal regulatory framework, makes the exponential rise in the number of road accidents all the more worrying. The statistics show that in Brazil, 30,000 people die every year in road accidents. Of these, 44% are between 20 and 39 years of age, and 82% are men.”

Luis Inácio Lula da Silva, President, Federative Republic of Brazil (cited in WHO 2004)

This quote really emphasises the involvement of breadwinners in road traffic crashes. The

**Box 1: The role of road injuries in increasing poverty**

TRL, together with local partners conducted large-scale household surveys to assess both the scale and longer-term consequences of involvement in road crashes in two locations in North Asia. Stratified cluster sampling of 83,199 households in Bangladesh and 19,797 Bangalore (India) in pre-selected rural, urban and slum areas was carried out. The interviews were supplemented by contacting 156 bereaved households (from police records) and 367 seriously-injured victim households (from hospital records) in Bangalore (see full report for details). The main results were as follows:

**Impacts on households**

While only one household member may be involved in a crash, the impacts will be felt by the whole household, which includes, on average, another four people.

**Direct and indirect costs**

Road crashes impose a double financial burden on poor households. At the same time that they face unexpected medical, if not funeral, costs, they also lose the income of the victim and/or carer. Urban poor Bangladesh households paid the equivalent of almost three months household income on funerals, a significantly greater proportion of household income than the non-poor.

**Consequences**

Over seven out of ten poor families suffered a decrease in total household income after a member was killed or seriously injured in a road crash. Less income means less food to eat. Seven out of ten Bangladesh poor bereaved households reported food consumption decreased after a road death. While the impact was slightly less on the seriously injured households, the poor were significantly worse affected than the non-poor (59% of urban poor vs. 25% non-poor). The burden from road crashes appears particularly high, tipping many households into poverty. In Bangalore 71% (urban) and 53% (rural) of poor households interviewed were not poor before the fatal crash.


effect of young, productive people being killed or injured in road crashes has not only a huge impact on the economy, but also on the dependent families that they leave behind or burden once seriously injured.

The cost of crashes in urban areas has also been calculated to be very significantly higher than those occurring in rural areas due primarily to the much higher costs of congestion and hence loss of “time” to other road users when this is included. A recent national road crash and injury costing study for Thailand estimated that for this reason the costs associated with road casualties in Bangkok were over ten times greater than those occurring in much more rural areas (Prince of Songkla University 2007).

The role of local authorities in reducing road casualties is crucial. However, despite the need to improve the situation, a comprehensive road safety strategy is seldom top of the local political agenda. Inefficient political decision-making processes, other issues such as the management of traffic flows, spatial and urban planning, economic and financial problems often hinder local authorities in taking steps to improve road safety. Nevertheless, all local authorities, whether or not they have a statutory responsibility for road safety, must recognise that they play a key role in reducing road casualties through their statutory functions and their local influence. An urban safety management strategy should be developed which focuses on reducing the number and severity of road crashes within the context of the development and transport goals of the local authority. The Urban Safety Management approach is outlined in Box 2.

Widely acknowledged strategies to improve urban road safety include:

- Providing assistance to road crash victims (Section 8);
- Sound financing of road safety policies (Section 9); and
- Integrating all of these elements into a “comprehensive road safety policy” (Section 10).

All road safety activities should be monitored to ensure that the money is being spent effectively and lessons are learned about the most and least successful measures and schemes. Monitoring of an action plan must focus on whether the objectives are being achieved.

Safe Systems approach

Currently the recommended approach to improving road safety further amongst the leading performing countries is the “Safe System” approach.

The main underlying principle is that human beings will always make errors and because of this it is essential that exposure to forces that could potentially kill or seriously injure must be controlled.

Developed from successful approaches to safety employed in more predictable, closed situations such as rail or air travel etc., safe systems aims to manage crash forces in the case of road safety.

The approach also emphasises:

- Network infrastructure improvements with posted speeds appropriate for the given level of protection on given roads;
- Economic approach to emphasise the scale of the issues and to target actions to gain maximum returns and impact;
- Development of comprehensive and inclusive management structures for safe transport operation;
- Seeing safety in the wider context of broad economic development, environmental and health goals; and
- Shared responsibility for safety by all stakeholders.

The Safe Systems approach was developed from a recognition that the traditional suite of safety strategies previously used in High Income countries were unlikely to deliver further road safety benefits. Its proponents state that the approach is appropriate for all countries, not just the high achieving High Income Countries (OECD/ITF 2008).
Box 2: Urban Safety Management

Urban Safety Management (USM) has been developed and effectively used to specifically improve road safety in built-up areas. The approach has been championed in the UK and the Netherlands, and TRL produced a manual specifically adapting the methodology for LMICs in 2004. The USM approach has been shown to reduce casualties in towns and cities by tackling accident problems on a broad front. The approach is relevant to all built-up areas in which drivers have substantial choice of route. For free-standing towns, the approach can be applied to the urban area as a whole. In larger cities, it will usually be more practical to divide the urban area into sub-areas each of which can be considered as a whole. The approach requires all interest groups to work closely together to raise the profile of traffic safety in town management and planning.

The USM approach should be used for the following reasons:

- In urban communities, multiple objectives are set concerning the promotion of local activities and the movement of traffic, often under competing interests. In this context, road safety problems cannot be treated separately.
- Accidents are usually dispersed across an urban area. However this distribution is subject to fluctuation. Therefore, it would be inappropriate to design countermeasures for individual accident sites only.
- Safety measures are more effective if they form part of a comprehensive safety policy. To ensure maximum impact complementary measures of a policy should be identified and co-ordinated.
- Traffic safety may not be a leading priority issue for local policy makers or citizens. Therefore, as well as direct safety initiatives, there is a need for embedding safety measures in other policies.
- Integrated safety programs help local authorities compile a complete picture of existing problems before defining priorities for action.

Elements of Urban Safety Management approach

USM defines the principles of a good safety management strategy as one which:

- Formulates a safety strategy for the urban area as a whole;
- Integrates safety with other urban strategies (e.g. transportation, land use planning, Safer Routes to Schools);
- Considers all kinds of road users, especially vulnerable road users;
- Considers the functions of different kinds of road;
- Integrates existing casualty reduction efforts into the strategy;
- Uses opportunities where other policies and strategies may help to enhance safety (e.g. improving safety within an urban regeneration project);
- Encourages all professional groups to help to achieve safety objectives;
- Guards against possible adverse safety affects of other policies;
- Encourage residents and all road users to become actively involved in the process and thereby take ownership of it;
- Translates the strategy and objectives into local area safety schemes;
- Monitors progress towards the safety objectives.

Adapted from:
Vision zero

Vision zero is an initiative adopted by the Swedish Government. The basis of the philosophy is the idea that no fatal or serious injuries need occur on any roads providing that the vehicle, driver and infrastructure adhere to standards which are currently achievable.

Vision zero encompasses the “Safe Systems” approach which in brief aims to ensure that the potential for energy exchange in any possible road crash will be below the level whereby human tolerance means that a serious or fatal road crash will result. Thus vehicle speeds on streets where pedestrians are present must be below those which will result in serious injury to those outside the vehicle in the event of a collision. Similarly high speed roads should be physically divided to ensure that the cumulative energies of opposing vehicles cannot meet in a head on collision.

2. Organisation of local road safety

International experience shows that two aspects of road safety make it difficult to manage effectively. First, road safety involves a great number and variety of stakeholder organisations to cover all aspects of the relevant safety issues. Local public bodies responsible for traffic management, maintenance, and construction (public works), the police, school administrations, civic and advocacy groups at the local level, health care providers, emergency medical services, the local private sector and, last but not least, concerned citizens are the key players in improving safety on the road. So all and any road users, in any capacity, and by any mode are stakeholders for safety.

Secondly, the various organisations do not usually have road safety as their primary objective. Hence, road safety activities often get neglected. In order to overcome these difficulties, local authorities should make maximum use of their influence in support of road safety promotion. Therefore, they should ensure coordination between the various disciplines, institutions and organisations involved. Only if a community takes ownership of the road safety issue, can changes take place.

Environment and planning

There is currently much increased concern over the environmental consequences of the use of fossil fuels for vehicular transportation. The problems are both immediate such as the impact on health of the pollution produced and longer term, most significantly the contribution of green house gases to climate change. Increased reliance on motorised transport will also have a significant impact on health since it will result in greater levels of obesity.

For these reasons it is becoming increasingly clear that it is important that future transport planning tries to minimise or control the “one person in one car” option. Thus measures are being promoted to keep people on foot or bicycles for relatively short journeys, and ideally on public transport for longer journeys. There are clear implications for road safety since these measures encourage vulnerable road user modes. It is therefore vital that these schemes plan for
the safety of these road users adequately through appropriate provision of footpaths and crossings for pedestrians, and segregation of two wheelers and animal carts from other faster traffic.

Transport plans which aim to reduce reliance on the car by encouraging trips by public transport can potentially improve safety by reducing the populations’ exposure to unsafe trips. This is conditional on the safety levels of the alternative modes which are provided.

Similarly the better planning and siting of amenities such as schools, offices and shopping facilities can play an important part in decreasing the need to make road trips.

Two different approaches have been developed to organise road safety at the national level. One approach favours the establishment of a “National Road Safety Council” (NRSC), the other promotes a Lead Agency from among the various existing institutions involved. Both approaches, however, aim at allocating responsibility at national, regional and local level and creating ownership. Given the multi-faceted and multi-level nature of road safety, co-ordination

**Box 3: Capacity reviews**

Currently the World Bank recommends that a road safety management capacity review is undertaken in any country to establish a clear list of actions and targets before any major investment program which aims to reduce the problem of road safety.

The recommendations of the World Report (2004) highlight safety management issues at the global, regional and country levels, and emphasise the building of institutional capacity to manage for results. In particular the recommendations emphasise the importance of implementing a systematic and sustained response to govern road safety outcomes at the country level, and place prime importance on the vital role of the lead agency in this process.

These implementation guidelines focus on strengthening the road safety management system and place special emphasis on related lead agency responsibilities in ensuring institutional efficiency and effectiveness.

of road safety is essential (GRSP 2001, Road Safety Management, Information Note 1).

The US National Highway Transport Association, for instance, has developed the “Safe Communities Approach”, where all partners participate as equals in developing solutions, sharing successes, assuming risks and building a community structure and process to continue improvement of community life through the reduction of injuries and costs (http://www.nhtsa.gov/Driving+Safety/Safe+Communities/Welcome+to+Safe+Communities).

Depending on the size and the magnitude of the road safety problem, working groups, road safety units or commissions can be established to exchange information, to design a strategic urban road safety plan or program, and to implement the measures and activities.

A strong link between the police authorities and the local agencies related to road traffic management and road building and maintenance should be established to exchange information about crash sites and characteristics. Road safety units have been established, for example, in Fiji, where they work successfully in the identification of black spots and dangerous sections of the road network and the development of site treatments, such as low cost engineering measures or targeted law enforcement.

Local politicians play an important role when decisions related to road safety strategies and the implementation and financing of road safety measures have to be taken. The local administration should therefore keep up a continuous dialogue with these representatives to raise their own awareness of the issue.

Co-operation between the public authorities and the non-public sector has been successful especially in the field of information, education and awareness raising. Volunteer road safety organisations support campaigns and educational programmes, primarily at the local level. Public-private pilot projects supported by the Global Road Safety Partnership (GRSP) related to children’s safety in Warsaw and Bucharest are good examples of sharing road safety responsibilities.

Alongside government and businesses, representatives of civil society are increasingly being recognised as an important partner in the delivery of road safety. Representatives of civil society may include those representing or caring for those involved in road crashes or their families (e.g. red cross/crescent societies, bereavement organisations), or those that represent the road users (e.g. automobile clubs, motorcycling groups, pedestrian or cycling associations, groups representing the elderly or blind). These organisations often have an extremely wide reach through their membership, and can inform a large proportion of society about road safety through their communications activities.

The design of a road safety plan which allows the participation of all major stakeholders should be elaborated by identifying areas that

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**Box 4: Global under-reporting**

**Global status report on road safety time for action, WHO 2009**

The WHO conducted a major exercise to gather statistics on road deaths and injuries in member states, as well as on the status of traffic laws and levels of enforcement. The results indicated that surveillance of road deaths globally is poor, especially, but not exclusively in LMICs.

“The report shows that huge gaps remain in the quality and coverage of the data that countries collect and report on road traffic injuries. Reliable data on fatalities and non-fatal injuries are needed by countries to assess the scope of the road traffic injury problem, to target responses to it, and to monitor and evaluate the effectiveness of intervention measures. Underreporting of road traffic fatalities remains a big problem in many countries, and the situation is even worse with regard to non-fatal injuries.”

The process also undertook a modelling exercise, which took account of population, vehicle fleet and other factors to estimate what the realistic road death numbers could be, with some startling differences identified between official numbers and the probable actual numbers.

“The total number of deaths reported in this survey is approximately 660,000 (using a 30-day definition for fatalities), indicating vast under-reporting. When these data are modelled the total 30-day number for the 178 countries included in the study is 1.23 million.”
need improvement (UNESCAP, 2001). Goals have to be set and partners agree to them. Too many and too ambitious, or even unrealistic, goals would undermine the motivation of all participants, but realistic targets can be a powerful motivation. A step by step approach is recommended. It is important to focus plans on the most vulnerable groups, such as children, elderly, poor and non-motorised transport users in general, and to keep the plans simple.

**Box 5: Traffic fatalities increasing in poor countries**

Traffic accidents are a major cause of death and injuries worldwide, but while declining in the developed world, fatalities are still on the rise in many developing countries.

The close correlation between health and economic growth was unveiled in a report from the World Health Organization (WHO). A commission chaired by the US economist Jeffrey Sachs claims that each 10% improvement in life expectancy spurs between 0.3 and 0.4 percentage point rise in growth rates.

Road accidents turn out to be a substantial cause of death in many areas of the world, according to the Mobility 2001 report issued by the Sustainable Mobility Project. Toward the end of the 1990s, between 80,000 and 90,000 people were killed each year in road accidents in Western Europe and North America. In some countries, road accidents are the primary cause of death in the 15- to 30-year-old age group.

Still these numbers seem low when measured against traffic fatalities in developing countries. A few examples: The city of Bangalore suffered from 16.1 traffic fatalities per 100,000 people in 1995, compared to 18.3 per 100,000 in Brazil in 1995 and 33.3 per 100,000 in Johannesburg (1991/92). In comparison the G7 countries in 1996 had 0.6-1.6 traffic fatalities per 100,000 people.

The trends are also highly dissimilar throughout the regions of the world. During the last decade all industrialised countries have experienced substantial abatements in traffic fatalities – down 25% in Western Europe and 30% in the US. Safer vehicles and highway designs and better post-accident care are

In contrast, words like “unacceptable” and “dangerous” are used to describe the situation in the developing World – and the situation appears to be deteriorating. Low-income countries suffer some 80 times more traffic fatalities per vehicle than high-income countries (albeit the difference in fatalities-per-capita is less severe). Pedestrians and cyclists are generally disproportionately represented among accident victims – and so are poor people. The lack of institutional, engineering and infrastructure interventions are evaluated as more important explanations than merely the number of cars. Lack of driver training, public education and insufficient law enforcement are other reasons behind the statistics.
3. Assessing the problem

Assessing the road safety problem at the local level requires a clear understanding of the numbers, distribution and characteristics of crashes and casualties and of the physical and social environment within which the solutions must be developed. Crash and casualty data are commonly collected by the police but there is an acknowledged problem of under-reporting. The extent of this is much greater in developing countries, so the scale of the problem is often very much larger than revealed by police statistics (see Box 4). Given this, it is often useful to collect overall road casualty data from several sources, particularly in the health sector, in order to supplement police data. However the data collected by the police is usually the only source from which detailed information about the nature of individual crashes can be obtained, and these data are essential for detailed analysis of problems at specific locations in order to design remedial measures. Police report forms should permit the collection of data related to:

- The location of each crash (particularly by map coordinates, also by road name, road class);
- The time – by year, month, day of the week, time of the day;
- The participants’, casualties and vehicle details including age, sex, vehicle types (inc. pedestrians and animals);
- The outcome of the collision such as the severity of injuries and material damage;
- Road conditions – such as junction type, signs, road markings, roadside obstacles;
- Environmental factors such as light conditions and weather;
- A description including a collision diagram; and
- Other contributing factors such as alcohol use, traffic law violations, use of seat belts or helmets.

Analysis systems should enable investigators to identify themes in the data, for example alcohol use or excessive speed, in order to direct appropriate treatments, enforcement strategies or educational needs. Crash location maps have also proven to be a useful tool. They can be produced by using computer-based software and mapping, which is now increasingly available even for LMICs through applications such as Google Maps. These maps allow identification of so called “black spots”; stretches or road sections with a concentration of crashes which may be reduced through road engineering treatments. With computerised records, modern software enables investigators to carry out in-depth analyses of the data (see Figure 5, 6).

Another useful tool is a collision diagram (Figure 7), especially for dangerous locations where an accumulation crash records can be studied. They provide information about the turning to the left/right or pedestrian

![Figure 5](image-url)
involvement. Common features in the diagrams for a specific site identify the particular problem which a remedial treatment should address. The data should be supplemented by traffic and appropriate demographic information to achieve a comprehensive analysis which identifies higher than expected crash rates, or unusually high proportions of a particular crash type.

Site investigations are also crucial in addition to the desk studies for identifying road infrastructure problems and appropriate engineering solutions. The inspections should also be carried out during darkness for example for those places where crashes are identified to occur more frequently at night, to check whether visibility or light conditions may be contributing to the problem.

By creating a working group or commission (see margin note), composed of representatives of all local authorities involved in road safety such as the police, the traffic management authority and the road or highway authority, the exchange of information and the elaboration of proposals for short, medium and long-term solutions can be done in a multidisciplinary way. Additional representatives from the school authority or interest groups such as cyclists or market traders can be included as advisors in these commissions to obtain a better understanding about the risk situations which different road user groups have to deal with.

Figure 6
Cluster analysis for Central Gaborone, Botswana.
Botswana Traffic Police/TRL 2009, MAAP

Figure 7
A collision diagram from Malaysia.
TRL/JKR 1995
Box 6: Deaths per hour: 2.4
The severity of road safety problems in developing countries is illustrated by the following article. Many aspects mentioned in the article (e.g. cooperation between agencies) are discussed further in this module.

Death toll hits 59 in mass exodus ahead of Thai holiday

BANGKOK, April 12 (AFP) – The death toll from road accidents hit 59 on Friday and 3000 others have been injured as Thais stage the annual mass exodus from Bangkok to celebrate the traditional new year, officials said.

“As of now there has been an average of 2.4 people dying and 155 injured every hour”, Public Health Minister Sudarat Keyuraphan said in a statement after the first 24 hours of the toll count. In the hopes of curbing the fatalities that marr celebrations for the “Songkran” water festival every year, police have said that a drink-driving ban will be strictly enforced. National police and the public health and communications ministries have joined forces to set up 100 checkpoints across the country to test motorists for alcohol usage. If found to have imbibed, they face a jail.

During last year’s six-day Songkran festival some 530 people died and 32 014 were injured in road accidents. This year, public health officials are braced for the toll to rise to 600 (AFP, 12 April 2002).

Box 7: Establishing a road safety working group or commission

- Designate or elect a chairperson and determine what other executive officers may be necessary;
- Decide how membership will be determined and how long members will remain involved;
- Specify the length and frequency of meetings;
- Determine the procedure for making decisions (consensus, majority vote, board decision);
- Determine roles and responsibilities for members; and
- Decide whether working sub-groups should be established and if they are based on functions (data workgroup, fund-raising committee, planning committee, public relation/communication) or by priority areas (safety belts, impaired driving).


Figure 8
A combination of low cost measures such as better channelisation, medians and traffic signs, for example – could have averted this accident in Bangkok, Thailand, which was caused by confusion surrounding a contra-flow bus lane.

Karl Fjellstrom, Dec. 2001
4. Creating a safer road environment

Box 8: Road safety audit

Road safety audit has been mandatory on major road schemes in the UK for many years and is now also a legal requirement in Australia, New Zealand, Germany, Denmark and a growing number of others countries. Many countries have now developed sound guidelines in this field, and the practice is spreading to low and middle income countries, particularly for schemes funded by international donors. The Public Works Department of the Government of Malaysia has developed, and uses, a particularly good set of road safety audit guidelines (JKR, Malaysia, 1997). These define road safety audit as: “the formal examination of the planning, design and construction of a road project, and of the characteristics and operation of an existing road, by independent and qualified examiners, to identify any potentially unsafe feature or operational arrangement that may adversely affect the safety of any road user”. It is important to recognise that this process:

- Is formal and independent of the design;
- Is done at various stages in the planning and design process;
- Is carried out by properly qualified staff; and
- Considers the safety of all types of road user.

The process of adapting the layout and use of roads and footways in urban areas to manage the exposure of road users to risk will be in many cases a lengthy one. At every stage in this process, the responsible authorities should be taking all practicable and affordable steps to reduce casualties in the prevailing situations and to contribute to their further reduction in the longer term. Short term measures should address the existing transport system as a whole to reduce the number of collisions and injuries. Longer term measures must consider the planning and development issues surrounding the growth of the urban areas and focus on policies that prevent the creation of new situations in which life and limb are put at risk. All new road proposals should be subject to a safety audit, by independent safety specialists (see text box). For the treatment of hazardous locations and parts of the urban road network which expose users to high levels of risk, low cost measures (Figure 11) have shown a great potential in reducing the number and severity of crashes. These short-term measures are easy to implement and often do not need long bureaucratic procedures (also see TRRL/ODA, 1991 and the iRAP “Toolkit” http://toolkit.irap.org). Systematic analysis of collision diagrams and crash reports identify the features which should be improved. They often include:

- Improvement of traffic signs;
- Improvement of road marking and delineation (for example bus, motorcycle or cycle lanes);
- Small construction measures which can be integrated in road maintenance activities such as improvement of the road surface.

Some countries report poor performance of road signs and markings, largely because of poor understanding and compliance by road users. Trials can help identify such potential difficulties, and integration with publicity and enforcement may help overcome poor compliance.

“Well-designed measures, based on analysis of crash records, have shown a great potential in reducing the number and severity of accidents, often at low cost.”

It is important that road safety benefits are not arbitrarily ascribed to highway/road proposals or developments without an assessment of their
Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities

Pedestrians and cyclists are the most vulnerable road users. They are often at risk due to the conflicting use of the same road space by different types of road users, for example pedestrians using the roadway because of the absence of a sidewalk. Measures to benefit non-motorised transport users and urban planning objectives (ETSC, 1999) must be developed. In the UK, the Institution of Highways and Transportation suggest that the following hierarchy of measures should be considered before a design solution is chosen: traffic reduction, speed reduction, junction treatment, redistribution of road space and provision of special facilities such as pedestrian crossing islands or cycle paths (for further information, see http://www.ciht.org.uk).

Speed

Speed reduction is an especially important tool for improving safety on roads. At lower speeds crashes are less likely to occur since the driver has more time to react and resulting injuries will be less severe. Controlling vehicle speeds is one of the main mechanisms to moderating the potential for energy transfer between parties in a crash and thus a key element in of the Safe Systems approach.

In urban areas in some European cities permitted speeds have been lowered to 30 or even 20 km/h on streets in residential areas. This can improve safety for cyclists/pedestrians, but also has the aim of improving the liveability of these areas, reducing the prominence of motorised modes. The process of setting speeds needs to take into account the hierarchy of the road in addition to the “design speed” which may be miss-matched to the actual usage.

In many LMICs, speed limits are not set in a manner that is appropriate for the road environment. Often the lowest speed limit in a country is 60 km/h (and in some cases even higher), which is too high for urban areas. This speed limit can be applied in a blanket manner across all urban areas. Moreover transitions into urban areas are often unclear, making this particularly difficult to adhere to for the motorist and for the police to enforce. Speed limits of 50 km/h or 60 km/h can also sometimes apply on major divided highways; again such speed limits are unenforceable because the road design often lends itself to much higher speeds.

Inappropriate speed limits can further jeopardise the safety of pedestrians since the lower (but inappropriate) speed limits can permit planners to install zebra crossings across wide roads. However in reality nothing has been done, other than setting a speed limit, to ensure that drivers are moving slowly enough for such facilities and so pedestrians must try and cross in amongst often very fast moving traffic.
Home zones/mixed use

Generally the road safety of vulnerable road users has tended to be promoted mainly by segregating them from motorised traffic and carefully controlling the different traffic modes. However, this can lead to an inappropriate hierarchy of power on the road way which favours the motorised vehicles, with them monopolising road space. In order to provide greater equity for slower and more vulnerable road users, the notion of ‘shared space’ has been introduced. In shared spaces, clutter, controls and designated spaces for different types of road user are removed. In some cases, all such measures are removed. The idea is that the vehicle driver will exercise caution due to the uncertainty of driving where there are no signs or markings and where a vulnerable road user is sharing the road space.

Some evaluations in High Income Countries (HICs) report a significant safety benefit with these schemes. What is unclear is the long term effect of such schemes once the initial novelty has worn off, and also whether this would be appropriate in LMICs. It could be argued that most LMICs already have similarly ‘low control’ environments similar to those advocated by ‘shared space’ enthusiasts. Moreover it is unclear to what extent such schemes could be beneficial where road safety culture is significantly less developed.

Table 1 and Box 9 illustrate the economic returns from low cost engineering schemes, from analyses in the USA and the UK. Whilst the results are not necessarily directly transferable to LMIC cities, they illustrate the potential which can be achieved by carefully designed schemes which target specific problems, as revealed by analysis of crash records.

Special attention should be given to road construction areas, where the risk of a crash is high. An appropriate arrangement of traffic signs and safety devices, as well as public information, specific traffic circumstances is important to enhance awareness about the specific traffic circumstances.
On behalf of the UK Department for Transport, the Transport Research Laboratory (TRL) maintains a database of local authority road safety schemes (the MOLASSES database). These are generally low cost schemes which address known problem locations. Table 1 presents the average first year rates of return by type of scheme. A total of almost 2,000 schemes are included in this analysis. The average cost of all schemes was GBP 23,400, with an overall average first year rate of return of 372%.

**Table 1: Local authority road safety schemes in the UK – first year rates of return by type of scheme**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Measure</th>
<th>First year rate of return %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bend treatment (revised signs and marking)</td>
<td>722</td>
</tr>
<tr>
<td>2</td>
<td>Priority junction</td>
<td>523</td>
</tr>
<tr>
<td>3</td>
<td>Route treatments</td>
<td>520</td>
</tr>
<tr>
<td>4</td>
<td>Cycle schemes</td>
<td>444</td>
</tr>
<tr>
<td>5</td>
<td>Overall link improvements</td>
<td>276</td>
</tr>
<tr>
<td>6=</td>
<td>Signalised junction</td>
<td>266</td>
</tr>
<tr>
<td>6=</td>
<td>General link treatments</td>
<td>266</td>
</tr>
<tr>
<td>8</td>
<td>Link traffic calming</td>
<td>260</td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian facilities</td>
<td>246</td>
</tr>
<tr>
<td>10</td>
<td>Area-wide schemes</td>
<td>225</td>
</tr>
<tr>
<td>11</td>
<td>Roundabouts</td>
<td>176</td>
</tr>
</tbody>
</table>

Gorell and Tootill (2001) “Monitoring Local Authority road safety schemes using MOLASSES” TRL report TRL512, Crowthorne, UK
5. Raising public awareness and road safety education

Public awareness campaigns have one or more of three goals:

- To inform the public of the nature of problems and to prepare for change (e.g., in the law);
- To change attitudes; and/or
- To change behaviour.

If the general level of knowledge about road safety issues is low then it is important to provide information which both raises awareness of the issues and provides a background against which more specific changes – for example in legislation and/or enforcement – are more likely to be accepted by the general public. Research in highly motorised, high income countries shows that road safety publicity campaigns, by themselves, have only limited impact on attitudes and behaviour. However, when combined with other activities, especially law enforcement, the combined approach can reduce the number and severity of injuries.

“Combined with enforcement, road safety publicity campaigns improve road user behaviour and reduce road crashes.”

There is little evidence about the impact of publicity campaigns in low and middle income countries, but it seems reasonable that the lower the level of knowledge, the more likely it is that campaigns or education will be of benefit, especially if combined with legislation and enforcement. However, to raise public awareness regarding safer traffic behaviour takes time and can only be successful if the messages are repeated often. Therefore, it is crucial to link awareness raising measures to specific problems, and to a target group. It is also important to have a clear objective and to evaluate the impact of the measure. GRSP has published guidance on road safety publicity campaigns which stress the linkage between campaigns and enforcement.

The guidance stresses the importance of clearly defining the problem, setting out the objectives of the campaign and evaluating its impact.

Means of raising awareness include various public communication tools such as public information in the media, road side information, road safety events, educational measures (driver education, traffic schools for children), “Walk-To-School” events (see Figure 17), and so on. Such events often involve a large number of related governmental and civil society organisations. Whilst these activities are widespread, there is debate about their effectiveness. They are rarely subject to evaluation, in part because they usually are part of a package of road safety measures and it is impossible to attribute any changes in crash or casualty numbers to such activities in isolation.

Road traffic schools (Figure 18) are used in a number of countries to raise public awareness about road safety through educating children. They aim to teach school children better traffic behaviour, although there is debate about their effectiveness. In Germany, for instance, they have been used since 1949 in cooperation with the German Shell company, school authorities and the police. This model has been transferred, for example, to the city of Montevideo, where a children road safety school provides theoretical and practical education. Theoretical education on traffic rules and behaviour is complemented by practical exercises in a learning area that is especially prepared for this purpose, usually within the school ground or a nearby property.

Figure 14
Road safety campaigns often aim to influence driver’s behaviour, as illustrated by this sticker at a Thai Traffic Police station.
Photo by Dominik Schmid, Buriram Province, Thailand, 2010
The main emphasis, however, is placed on the training and testing of the children as cyclists. The system of road traffic schools in Germany is part of the official school traffic education and is included in the curricula of the third and fourth school year. Shell provides the children's traffic schools with bicycles, helmets, traffic signs and, together with the police and the school authorities, is involved in the improvement of the educational program.

The involvement of children in crashes, particularly while travelling to and from school and in the vicinity of their homes, is often the subject of considerable local concern. The development of “safer routes to school” can be effective in improving both children’s and parents’ awareness and understanding of road safety problems, and by making journeys to school safer. These kinds of projects are undertaken in cooperation between parents, school staff and local traffic authorities and have been implemented in many countries and cities around the world. Safe routes to school plans are developed to find the roads or pedestrian roadsides which are the safest for children, to provide a context for local improvements to the road and footway network, to provide pedestrian crossings to improve safety and also to identify those parts of the road network which should be avoided. Information concerning the traffic flow, junctions and pedestrian crossings are gathered as well as the location of bus stops and public transport services.

Road safety training can also be beneficial for adult road users. Employers have found that there is both a business and a social benefit in providing Training to their employees, particularly those responsible for valuable vehicles carrying valuable cargoes. Major oil companies, such as Shell and BP, have led the way in this respect in low and middle income countries where more employee lives were lost in road traffic crashes than from other types of industrial accident. Training courses have been developed for car, bus and truck drivers as well as for motorcyclists.

In Argentina, a safety course for truck drivers developed by the German Road Safety Council within a German Government funded road safety project was presented, including theoretical and practical modules which were translated and adapted to the local needs. Local authorities (the ministry) have provided an unused airpot for the training sessions and Mercedes Benz Argentina (DaimlerChrysler) supported the course by lending two trucks. This kind of course can also be a first step towards the creation of an institutionalised licensing system for truck drivers, which often is lacking in developing countries.

The increased use of seat belts by car, bus and truck occupants has a great impact on the

Figure 15
Many developing cities have a diverse mix of motorised and non-motorised transport modes, moving at various speeds, often at high volumes within a shared, narrow right-of-way, as this photo from Suzhou, China shows. This poses particular road safety challenges, but police and transport agencies in developing cities instead tend to focus on how to assist motor vehicle traffic – often resulting in greater hazards for slower moving, non-motorised traffic.

Karl Fjellstrom, Jan. 2002
reduction of the severity of the injuries due to crashes. In many developing countries, particularly in Asia, motorcycle use is widespread, and the use of helmets offers substantial road safety benefits.

Use of occupant and rider protection (rear belts, helmets) is an area where the importance of linking publicity, legislation and enforcement is vital to achieve the maximum safety benefit. Unfortunately, however, experience to date shows that decision-makers in most developing cities tend to give insufficient attention to these aspects of road safety, and in particular to protection of more vulnerable road users.

Figure 16
The government in Bogotá, Colombia has supported many creative initiatives to promote road safety, including this 'road safety game' during a Car Free Day.

Photo by Karl Fjellstrom, Bogotá, 2007

Figure 17
Events like the US 'Kids walk to school Day' are supported by a wide range of government agencies, research institutions and NGOs.

Figure 18
Children’s traffic school in Lima, Peru.

Photo by Jeroen Buis, 2007
6. Enforcing safer road user behaviour

Strong but fair, and targeted enforcement is critical to the safe and efficient use of urban road systems. A substantial safety benefit can be achieved if road users are deterred from committing traffic offences. The presence of an effective police force which is seen to enforce the law if it is broken, is a primary means of ensuring safe road user behaviour. The examples of seat belt and helmet wearing cited in the previous section are good examples of this. Other critical aspects of behaviour where substantial road safety benefits can be achieved if they are properly controlled are vehicle speeds and drunk driving.

“Traffic law enforcement requires professional skills that are different from other types of police work.”

The main objective of enforcing traffic regulations is to deter violations and thus ensure road safety, not to maximise the number of infringement notices issued. Police activities should primarily increase road users’ perception of the likelihood of illegal behaviour being detected, and of being penalised if they are caught. Traffic law enforcement requires professional skills that are different from other types of police work, so the training appropriately of police officers therefore plays an important role.

Detection and deterrence can only be achieved if the law is specific about its sanctions. As urban road legislation varies from country to country, the main strategy should consist of combining enforcement activities (mainly speed and alcohol controls, helmet and seat belt wearing) with information and awareness raising measures. The involvement of civic and advocacy groups in this area is needed to raise consciousness towards the consequences of drink-driving or not wearing a helmet or seat belt.

Excess and inappropriate speed is a common traffic offence. There is a strong body of evidence which demonstrates that the risk of a crash, and the severity of its consequences, increase with vehicle speed. The development of a speed management strategy is a common strand of road safety policy in cities of high income countries, and law enforcement is a critical element of such a strategy. Two approaches of enforcement have been traditionally used: the stationary enforcement method generally involves an observation unit more or less hidden at the roadside and an apprehension unit, clearly visible, at which point speeding drivers are stopped. The mobile method is the enforcement from a moving unmarked or marked police car. The stationary method is much more cost-effective, and is recommended here. In recent years the introduction of speed camera technology has been highly cost-effective in developed countries, but only if they are used in the right way, which means putting the cameras in high risk locations (ETSC 1999). Radar detection may be more appropriate in low and middle income countries if they do not have the capacity to make use of the evidence provided by cameras and to bring offenders to court.

Local police authorities should adopt a road safety policy and the operational objectives should be coordinated with local/urban road safety plans. Urban Traffic and Transport Authorities should support the police in the introduction of technological aids for traffic law enforcement. As with many aspects of road safety, the coordination of activities by the various actors is essential for maximum benefits.
7. Promoting the use of safer vehicles

As vehicle safety standards are generally set at governmental level, or imposed de facto by the standards of imported vehicles, local authorities should ensure that all vehicles owned or operated by companies or under contract are maintained to good standards of safety, especially safety-critical parts such as braking systems, steering system, lamps and tyres. Increasingly, developing countries are adopting inspection & maintenance and roadworthiness regulations (see Module 4c: Inspection & Maintenance and Roadworthiness). A comprehensive inspection, maintenance and roadworthiness system requires close co-operation between vehicle roadworthiness inspection teams, trained vehicle mechanics and workshops (to guarantee vehicle repair according to safety standards and traffic police (to enforce vehicle inspection). Good databases and certification can also help ensure better standards by making it easier for the police to check that vehicles have been inspected as required by law. In most cases, technical vehicle inspection is complemented by vehicle emission testing, in order to meet the rising need for air quality measures to reduce pollution from transport related sources. A comprehensive inspection, maintenance and roadworthiness system distinguishes between private cars, heavy goods vehicles and public service vehicles. Heavy goods and public service vehicles, due to their more frequent use, should be inspected more frequently than private cars.
Overloading (Figures 20a and 20b) is a serious problem in developing countries, which relates to the technical specifications of vehicles. Vehicle types have a specific maximum carrying capacity, which depends on the structural strength of the chassis and is usually linked to the design standards of roads and bridges in a country. If this capacity is exceeded, vehicles may not react correctly in critical situations. The problem of overloading should be kept under special surveillance by the traffic police or vehicle inspectors. This is not only a safety issue, as overloaded vehicles cause disproportionate damage to roads and impose substantial economic burdens on the authorities responsible for maintenance. Thus limiting overloading is important both from a road safety perspective and to protect a city’s investment in its road infrastructure.

Overloading of vehicles with passengers, or carrying passengers in an inappropriate, unrestrained manner, is a clear and common safety hazard in low and middle income countries. In some countries it is common to observe a family of five using a single low-powered motor cycle, workers being carried on the open backs of Lorries, and people packed tightly into and on top of buses. Such practices can lead to significant and unnecessary loss of life.

8. Providing assistance to road crash victims

The health consequences of road crashes can be influenced by preventive actions before the crash (active safety), during the crash (passive safety) and after the crash (rescue, treatment and rehabilitation: Emergency Medical Response (EMS)).

The health services are usually only involved after the crash, but appropriate management of road casualties following the impact is a crucial determinant of the chance and quality of survival. Improvements in the immediate treatment of victims and emergency rescue systems have a great effect on road safety, so much so that health professionals talk about the “Golden Hour” and “Platinum Ten minutes” since getting appropriate care immediately is so vital to health outcomes. When organised ambulance systems are absent, as is generally the case in low and middle income countries, effective first aid at the crash site and appropriate handling of injured people, are important (Figure 21).

Efforts should be made to educate the public and those commonly involved in the transport of casualties (such as taxi drivers) in the basic actions that can be taken to preserve life and to avoid further injury to victims by inappropriate handling. Local authorities and employers can support first aid training both for staff and the general public. The widespread use of mobile telephones, even in countries without historic investment in cable-based telephone systems, offers an opportunity to develop a system of fast access to the emergency services through a single “999” or “911” style emergency telephone number which ideally operates throughout the country. Provision of first aid stations close to locations on rural highways is a way of improving access to medical assistance for crash victims and is being trialed in Kenya. By providing basic first aid training to police, fire services and other rescue personnel who are likely to attend road crashes, victims will have a greater chance of survival.
9. Sound financing of road safety policies

Without sound financing mechanisms, no serious road safety measures can be implemented or sustainably maintained. At a national level, the major funding sources are:

- Budgets ring-fenced for road safety in the relevant Ministries, drawn from general tax revenues;
- Levies added to insurance premiums or fuel;
- Traffic fines dedicated to road safety activities;
- Certain percentage of road user charges; and
- Private sponsorship.

At the local or municipal level, traffic fines, private sponsorship, and local public budget line complemented by national public funding, are particularly important for financing road safety activities, (see also GRSP, 2001).

In most countries, however, road safety is regarded as a public sector responsibility, and hence relies on state funding. In such cases a financial provision specifically allocated to road safety should be integrated into the urban transport or roads budget. It should be dedicated not only to road infrastructure measures, but also consider traffic law enforcement linked to financial support for publicity campaigns and public relations. Depending on the local government responsibilities it may also include elements for emergency services and education. The amount of the budget will depend on the local authority’s objectives, as specified in the local road safety plan.

In funding and implementing an urban/local road safety plan, the local authorities should seek to maximise funding contributions from those parties who benefit from the measures within the plan – primarily road users. This is why levies on motor insurance or local sales tax on fuel have an obvious appeal as they link directly to use of the road system, and provide a potential source of revenues which will grow in proportion to traffic in the city.

Private sector companies also will benefit from safer roads on which to operate and from an improved corporate image by investing in local road safety activities. Large commercial organisations such as banks, trading and oil companies are often willing to support road safety activities as part of their social obligations. For community-based road safety awareness activities, the sponsorship of local vehicle traders, insurance companies (vehicle insurance and medical care), and transport operators can support the work of local non-governmental organisations by providing support for education and information materials such as flyers, posters, and so on.

Whilst sponsorship has been used in some countries for many years to support road safety activities, it is generally ad hoc and not sustainable. The development of a partnership approach, lead by the Global Road Safety Partnership, has brought together government, business and civil society to address road safety issues. Such tri-sector partnerships add value in a number of ways. They raise the political profile of road safety issues, and can help to ensure that road safety activities are integrated into broader development plans.

![Figure 22](image-url) Launch of Bangalore drink driving campaign.
Photo by BATF

![Figure 23](image-url) Breath tests being administered in Bangalore.
Photo courtesy of NIMHANS (National Institute of Mental Health and Neuro Sciences), Bangalore
safety. They bring the skills and resources of the private sector to bear. They engage the community through NGO organisations such as the local Red Cross or Red Crescent society. The experience of GRSP is that more can be achieved by working together in this way (see Box 10 and Figures 22 and 23).

10. Towards a comprehensive road safety policy

The preceding elements of a sound road safety policy must not be seen as isolated or arbitrary items. Rather, they form the building blocks of an integrated policy. Integrating these elements is a pre-condition for successful road safety activities in this way both national and international experience can play a significant role when local authorities set their goals and plan the steps to be taken.

Many countries seek the advice of international initiatives, such as the Global Road Safety Partnership (GRSP), the European Traffic Safety Council (ETSC), the European Road Safety Observatory (ERSO) or national agencies such as the German Road Safety Council (DVR). The latter, for instance, is established and financed by the state (45% by Ministry of Transport), and by the private sector (55% by insurances, transport companies, etc.). In addition, The United Nations Road Safety Collaboration (UNRSC) coordinates road safety efforts at a global level. WHO also compile data on the numbers of road deaths and injuries globally. Information is available from the Global Road Safety Initiative (GRSi) and Global Transport Knowledge Partnership (gTKP) web sites. These institutions provide forums for discussion, the dissemination of information, best practices and lessons learned.

In addition a number of “How To” road safety manuals (available online at http://www.who.int/roadsafety/projects/manuals/en) exist for the key areas of seat belt use, drinking and driving, helmet wearing and speed management have been produced in recent years (see Figure 24). Most recently a manual on implementing crash database systems has been published and a further guidance on managing road safety is currently being prepared. These comprehensive manuals give step by step guidance on implementing a range of the most effective measures to improve road safety and are aimed at a broad range of practitioners and decision-makers.

Finally, a Comprehensive Road Safety Policy begins with good examples set by those who wish to improve the road safety situation.
Therefore, all those engaged in developing the road safety policy are expected to respect traffic rules and otherwise exhibit good conduct in traffic, both during and outside their working hours. A safety culture is a part of everyday life. As long as this is neglected by authorities and their staff, there will be no real change. How many more lives have to be lost on the world’s roads?

**Drinking & Driving**

Drinking and Driving is one of the main causes of road crashes worldwide. Effective drinking and driving programmes have the potential to save thousands of lives.

**Seat-belts & child restraints**

‘Seat-belts & child restraints’ is a practical guide to implementing, enforcing and evaluating seat belt programmes.

**Helmets**

A large proportion of the deaths of people injured or killed while riding two-wheelers result from injuries to the head.

**Speed management**

Speed has been identified as a key risk factor in road traffic injuries, influencing both the risk of crash as well as the severity of the injuries.

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**Figure 24**

How-to road safety manuals.

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