

4

**How to design
and implement
a speed management
system**

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THE PREVIOUS modules described how to assess the speed situation in a country or region and the tools that are available for managing speed. This module describes how to use this information to design and implement a targeted programme to improve speed management, and reduce the incidence of speed related fatalities and serious injuries.

The potential components of a speed management programme, using the tools set out in Module 3, are discussed in this module. These include implementing or strengthening legislation, reviewing or setting speed limits, enforcing speed limits, establishing suitable penalties and sanctions for offenders, introducing targeted public information campaigns and providing engineering treatments on the roads. It is divided into six sections:

4.1 Gaining political and community support: Before commencing a speed management programme, consulting and involving community and government stakeholders is an important step. This section discusses how to foster the support and actions needed for good speed management.

4.2 Stakeholders and roles: Achieving broad-based stakeholder support is essential for successfully implementing a speed management programme. This section provides guidance on setting up a working group of government stakeholders, a reference group of non-government stakeholders and advice on sustaining that support.

4.3 Preparing a plan of action: A discussion about setting objectives, targets and performance indicators is followed by advice on the necessary steps for developing an action plan that responds to those objectives. Guidance on issues to consider when choosing tools to deliver the plan is provided, including how to make the best use of resources.

4.4 Preparing for implementation: This section describes the range of legal, enforcement, planning, training and roll-out of engineering measures that has to be in place in order to implement a speed management programme.

4.5 Informing, influencing and involving the public: This section outlines the way to plan and carry out effective information, education and marketing campaigns in support of the speed management programme.

4.6 Planning and using pilot projects: It is often useful to test planned interventions before investing in and implementing a national or wide-scale programme. This section describes the benefits of conducting pilot projects as part of the speed management programme.

4.1 Gaining political and community support

The success of a speed management programme will depend overwhelmingly on winning the support of politicians, high-level community decision-makers and the community itself. Once evidence is produced that speed and speeding are problematic in a country or region, support from politicians (and other decision-makers) for the development or strengthening of a speed management programme must be obtained. The time that this is likely to take should be allowed for in planning.

4.1.1 Need for providing convincing evidence

Speed is a highly controversial issue, and speed reduction programmes must be carefully managed to gain and maintain vital community support for actions (Box 4.1). Even after producing evidence that speed and speeding are problematic, support from politicians and decision-makers for the development – or strengthening – of a speed management programme must not be taken for granted. While some political leaders may have a personal commitment to speed management and road safety issues, most will need convincing that the community wants them to do something (Box 4.2). As speed management necessarily restricts driving behaviour and driving choices, there is often a negative reaction by some sections of the community when speed management programmes are introduced.

Investing time and effort in involving stakeholders is worthwhile, as is communicating with the community about the intentions of the programme. Communication can include community discussion forums with representative groups and advisory councils, and stakeholder involvement can be developed through working groups. It is often best to begin with a ‘pre-sell’ process with government agency stakeholders or the people that will be the main programme implementation partners. In this way they can assist with the broader marketing of speed management, ultimately aiming to create a community demand for speed management that can lead to political commitment.

For communication with the broader community, print and advertising – often drawing attention to web-based material – are usually used. The community needs to be given time to adjust, particularly to new legislative and associated enforcement changes, as well as to any speed limit or infrastructure changes.

BOX 4.1 The case for winning community support

In a number of highly motorized countries, governments have reacted to public concern about behavioural change being sought through automated speed enforcement (such as with cameras) by discontinuing or reducing the level of automated enforcement after it has been in place for some time. The longer term road safety costs of such decisions are substantial, so great care needs to be

taken to ensure that measures such as these are sustainable before they are put in place. Community feedback should be collected and relayed to the politicians to indicate how workable the programme is. Otherwise there is a considerable risk that a noisy minority – who do not want to change behaviour – will unduly influence government.

4.1.2 Securing involvement of government leaders

As a programme moves from the development phase to the implementation phase it is vital to continue to encourage the active involvement of senior government officials within key ministries. Wide-scale speed enforcement programmes, particularly automated enforcement programmes, affect large numbers of people. It is important that the implementation of initiatives is actively monitored, and that ongoing results are regularly reported to senior government leaders.

Wherever possible, senior political leaders should be given a public role in announcing speed management initiatives. This will strengthen their commitment and ensure that they are fully briefed on the details of the initiatives.

BOX 4.2 Limits on acceptance by the public

People do not readily change their behaviour at the behest of government, unless they are convinced by a consideration of which they were not previously aware. Their use of the roads, which is interwoven in complicated ways with the rest of their everyday lives, is a good example.

Making the use of roads safer often requires changes in road-user behaviour – either in response to changes in infrastructure or vehicles, or in response to education, training, publicity, or regulation and enforcement. Progress in implementing changes is influenced by how acceptable they are to the public. A long-standing example is the seat-belt in the UK. Seat-belts had been available for two decades and their use by drivers and front seat passengers had been gradually brought to a level of 40% before use became mandatory: once the law was introduced, the percentage usage doubled almost overnight.

It may of course be possible to win over the public to accept something to which they are at first resistant, but this often takes time, and success should not be assumed. Exercise of judgment in such cases is complicated by the role of the media in influencing and interpreting public opinion.

While elected representatives are understandably influenced by the media coverage that issues of policy and their associated actions receive (or seem likely to receive), they would be unwise to suppose that this coverage necessarily reflects the balance of views held by the public. For example, there are sometimes sharp contrasts between views reflected in the national media and those reported more locally. It is therefore important to conduct scientific surveys of public opinion to counter any potentially biased representation by the media, and that the resulting information be provided to those responsible for decision-making (1).

Government ministers should receive regular briefings on the status of implementation and any issues arising. Part of the leadership role for the lead agency is to give governments the information needed to respond rapidly to community reactions to speed management initiatives. Key 'question and answer' briefings which succinctly explain why measures are being taken – and the evidence-based benefits that are being achieved – are an important way of assisting government, and increasing the likelihood of sustainability and success of the programme.

There is also benefit in engaging with opinion leaders in the community. They are vital stakeholders with the capacity to moderate debate arising in the popular media. They can be pivotal in maintaining community support as the impacts of change are felt. They should be kept fully informed as the programme is rolled out and as unexpected issues are encountered.



CASE STUDY: **India – the need for strong government support**

In order to improve road trauma outcomes in one Indian state, as part of an overall road safety project, it was agreed by the stakeholders that a pilot project to include speed management would be carried out on a section of national highway. Buses on this stretch of highway were not complying with the speed limits applicable to heavy vehicles within rural areas and towns along the highway, and were also overtaking dangerously. It was hoped that active enforcement would reduce the extent of death and serious injuries, and pave the way for a broader scale implementation.

The following tools were to be applied to achieve improved speed management (and safer compliance with road rules in general) along the pilot length:

1. A series of engineering measures:

- Clear speed limit signage.
- Edge, centre and barrier lines clearly marked to provide guidance for those overtaking, and to make it clear to drivers and pedestrians where the through traffic lanes were (so that pedestrians could more readily remain out of the vehicle lanes and vice versa).
- Removal of encroachment of temporary structures on the road pavement through villages along the trial 40 km section of highway.
- Installation of 'stop' and 'give way' line marking and signs on roads intersecting with the main highway.
- Preparation of advice to government on introducing increased powers for the highway authority to prevent unauthorized roadside development and consequent increased access to the road.

2. Public information and education campaigns carried out through schools along the route advising of:

- the dangers of excess speed
- other unsafe road user behaviours
- the need for safe pedestrian behaviours while walking along the road (as no footpaths existed in the rural areas) and when crossing the road.

Campaigns to support police enforcement of speed limits and other road-rule compliance measures were also prepared.

3. Preparation for enforcement activity. During the 18 months of preparation for this pilot, police training was carried out and hand-held laser speed monitoring equipment was purchased so that enforcement could be readily applied over the length of the highway.

When the time for implementation was reached, the police did not consider they were in a position to enforce speeds on the highway. This is because senior police advised that if a young constable were to intercept a senior government official or politician for a speeding offence, there was a chance that the officer would be transferred to a different part of the country within a few days.

This shows the difficult underlying culture in relation to road-rule compliance, particularly speed compliance, which exists in many low and middle-income countries.

The pilot – particularly the crucial speed enforcement component – did not proceed. This shows the importance of achieving community and political support for speed management measures and major shifts in cultural attitudes before expecting police to roll out measures in low and middle-income countries.

4.2 Stakeholders and roles

There are a variety of people and organizations that have an interest in speed or speed management. Some, usually government stakeholders, will have a responsibility for speed management and their role is discussed below. Some (such as motoring and freight transport associations) will not have any formal responsibility but want to see something done to reduce speed related road injury. Others may be opposed to efforts to restrict or reduce speeds.

The extent to which the stakeholders – outside the key government road safety agencies – can be influenced to support speed management programmes will determine what and how much can be done. Table 4.1 shows examples of stakeholder organizations, their role in speed management, the relative importance of their participation and the suggested level of action at which they should be engaged.

Table 4.1 Examples of stakeholder roles in speed management

Stakeholder	Role	Importance	Action
Political/government leaders	Legislate, approve actions	High	Advise/consult
Finance authority	Approve (extra) budget	High	Advise/consult
Road authority and/or road safety department/council (national)	Road engineering, traffic laws, traffic management, advertising	High	Working group
Licensing authority	Test and authorize drivers	High	Working group
Road authority (local)	Road engineering	High	Working group
Police	Traffic law enforcement	High	Working group
Ambulance/emergency	First response	High	Working group
Education department	Education of young	Medium	Working group
Health department	Care of the victim	Medium	Working group
Community leaders	Advocacy	Medium	Consult
Media	Influence public opinion	Medium	Advise/consult
Research institutions	Research and advocacy	Medium	Consult
Employers/transport industry	Influence/control drivers	Medium	Consult
Motoring associations	Influence drivers and policy makers	Medium	Consult
Road-safety community groups	Advocacy, campaigns	Medium	Consult
Insurance sector	Finance, influence practice	Medium	Consult
Vehicle manufacturers	Produce and advertise	Medium	Consult

As the policy and operational responsibility at the national level for speed management systems is usually divided between the (road) infrastructure department and the department of justice or interior (police), these two key agencies must have a real and workable interface for the speed management programme.

This is critically important as lack of cooperative efforts can reduce effectiveness. Legislative responsibility for road safety initiatives can lie with the ministry of transport or the road authority, or, in some cases, with the ministry of justice (police). The practical work concerning the determination of limits, the placement of speed limit signs (which must be in accordance with national or local traffic regulations) and the carrying out of any minor or major works on the road network is the responsibility of the road administration, and often of local governments.

4.2.1 A Working group of government stakeholders

Establishing a working group of key government stakeholders is an essential step (Figure 4.1). The working group will need to discuss government policy issues openly and negotiate agreed views on responsibility, deciding on what resources are needed and on policy direction. For these reasons it is recommended that membership is restricted to government organizations. In recommending this step it is assumed there is sufficient commitment at senior level within the government and its road safety agencies to address the issue of speed related crashes (2).

The working group should oversee and steer the programme, including taking decisions about overall objectives, and determining actions to be taken. These actions may use some or all of the tools described in Module 3 (road hierarchy decisions, speed limits, traffic safety and road environment improvements, legislation, enforcement, penalties and publicity campaigns) to achieve those objectives. Subgroups should be established as needed to deal with particular issues. This will require coordination of the programme with input to be obtained from all the main agencies.

The working group convener must appreciate the unique perspectives and contributions that each member brings to the programme. A set of individual responsibilities should be assigned to members – usually for action by the organization that the member represents – and the progress of their actions should be monitored by the group. Interactions between members can focus on ways that members can assist each other in carrying out these actions. For example, police may have difficulty enforcing speed limits in locations where the road authority may be able to assist with engineering treatments that make the task safer and more effective.

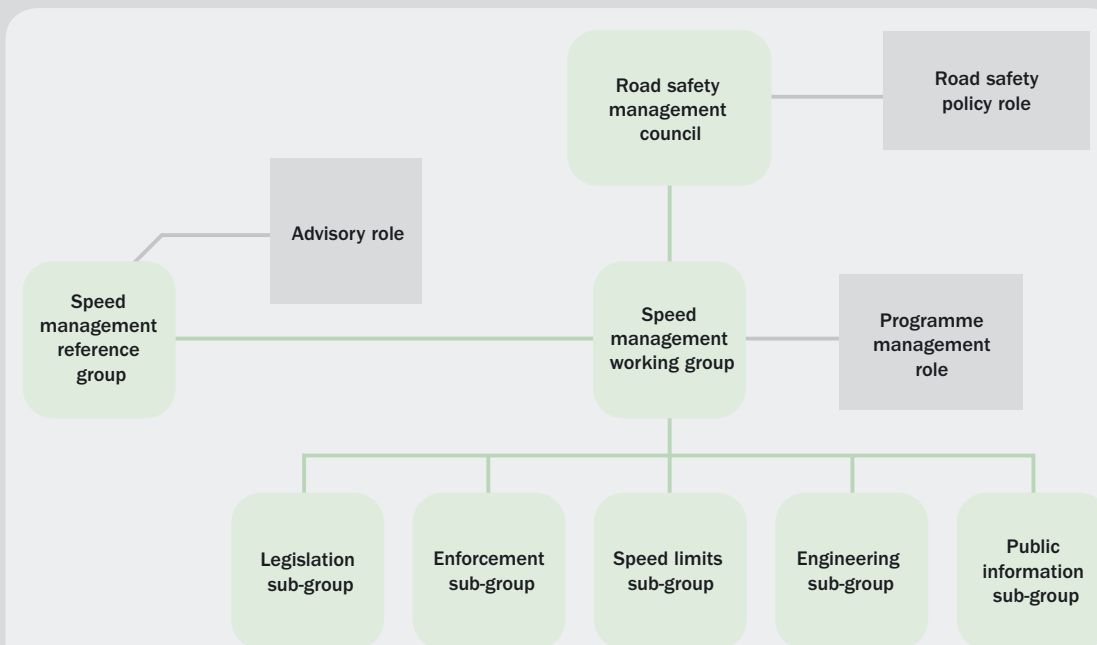


Figure 4.1 Representation on a speed management working group

The working group should be guided by the lead government agency for road safety. The group, through its ministry or agency heads, will have the ultimate responsibility for the design of the programme and the authority to act on recommendations, including substantial proposals which will require endorsement by the agency heads or by the elected government. Working group members may also need to negotiate a specific ‘memorandum of understanding’ between their agencies to achieve formal recognition of their commitments to the programme, and to identify their specific roles in implementation.

The working group, usually chaired by a senior government officer with primary speed management responsibilities, develops the action programme through consultations within the group. Particular projects within the programme can then be guided by subgroups chaired by an accountable officer.

One possible arrangement for segmenting the overall task is illustrated by Figure 4.2.

Figure 4.2 Speed management programme group structure

Based upon the objectives agreed by the group, the tasks of each sub-group could involve activities contained in Table 4.2 below.

Table 4.2 Suggested sub-group tasks for the speed management working group

Sub-group	Plan/develop tasks	Delivery tasks
Legislation	Assess legislation and propose changes	Assess compliance with legislation, adequacy of penalties
Enforcement	Determine enforcement methods and technology and how to support enforcement operations	- Identify needs of police, e.g. training, equipment - Strengthen enforcement of law - Coordinate enforcement campaigns
Speed limits	- Assess effectiveness of current limits in contributing to trauma reduction - Propose speed limits	Roll-out and review
Engineering	- Identify needs - Prepare proposals	Roll-out and review
Public information	- Assess public knowledge - Develop campaigns	Implement campaigns
Reference/advisory group	Consult on planning	- Consult on delivery - Involve in campaigns where appropriate

It is important that people take responsibility for managing the programme, instigating effective actions in a timely manner, acting as strong advocates and having a clear focus on results so that whatever coordinating and communication mechanisms are established, the groups do not just become ‘talking committees’ that do not achieve.

The meetings of the working group should be structured to enable implementation strategies to be jointly planned, and operational difficulties to be addressed. There should be well-defined working procedures and a clear work plan – extending to the eventual implementation. The coordination of activities by the different agencies is a demanding and time-consuming task; however, it is essential if the programme is to succeed. Communication – both between agencies and across the individual agencies – to ensure government and stakeholders are well informed needs to be carefully devised and actively maintained. The importance of a designated, responsible lead agency that oversees coordination of the various elements of the programme, public communications and briefings to government and stakeholders, cannot be overstated.

The government agency representatives on the working group would be expected to keep their senior manager and ministers’ office fully informed. It will be of considerable assistance to the group and to the success of any speed management programme if a road safety management group composed of the heads of the key road safety agencies – effectively a road safety management council – exists and is active.

Establishment of a ministerial committee of the key ministers with road safety responsibilities – to which this group would report – would be highly beneficial for all road safety related initiatives, including speed management.

4.2.2 A reference group of other stakeholders

The working group could be assisted by a reference or advisory group which could include organizations that have an interest in, or can make meaningful contributions to, the speed management programme (Figure 4.3).

The speed management working group chair could also chair the reference group, or an independent chair can be appointed. The organizations represented on the reference group can provide valuable input and feedback to governments on proposals for speed management and would be expected to brief and advise the group they represent about the matters being discussed.

Ideally, the reference group should also include those who might be critical of a new speed management programme. Their views should be acknowledged and understood, so that the proposed programme addresses possible objections and is acceptable to the widest possible segment of society. As a number of these organizations represented are often small in scale, the working group has to assess the significance of the views held by these organizations.

Figure 4.3 Model for a speed management reference group

4.2.3 Sustaining the involvement of stakeholders

Initiatives are unlikely to succeed unless there is substantial advance communication with stakeholders and the broader community prior to any ‘visible’ actions taking place. A joint planning calendar for implementing initiatives can be devised to assist coordination of actions between the representatives on the working group, as well as to enable other stakeholders to contribute to the programme in a meaningful way. The calendar can be a particularly helpful tool for coordinating local and national media and enforcement campaigns.

Speed management programme information can be provided to stakeholders through regular newsletters or briefing sheets, via email, by post or through regular telephone contact from designated working group members or their support staff.

Wherever possible, senior political leaders should be given a public role in announcing speed management initiatives. This will strengthen their commitment and ensure that they are fully briefed on the details of the initiatives. It is also important to have key police officers involved in any public announcements or strategies. This provides an operational face/identity to the community as well as showing police commitment to enforcement strategies – both a subtle and direct message to ensure compliance.

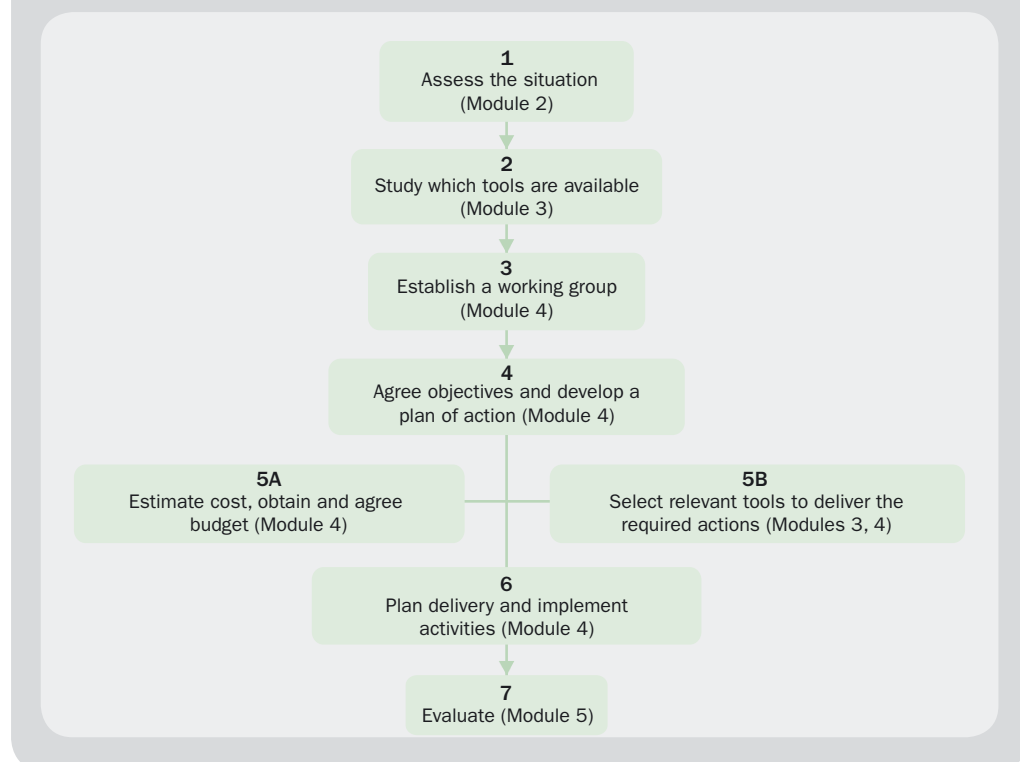
4.3 Preparing a plan of action

Before a comprehensive programme can be implemented, a plan must be set up that defines the objectives sought and lays out clear actions for how the objectives will be met. This plan must be backed by use of data, and will reflect analysis by the working group of this data and issues identified in the assessment set out in Module 2. There should also be a clear statement of problems and challenges in relation to public knowledge/awareness, legislation, speed limits, enforcement and penalties.

Based on the plan, a formal project proposal can be written. This proposal should detail the whole project cycle, describing the actions proposed to achieve the objectives in detail and their timing, the targets to be achieved, specific accountabilities for actions and funding to be sought. The working group will manage this process. Depending on the structure of government agencies and funding allocations, the proposal may split into a number of proposals as may be necessary for normal resource and policy approval processes.

Figure 4.4 shows the steps involved in developing an action plan and how these fit in with other processes described in this manual.

Figure 4.4 Steps for planning, implementing and evaluating a speed management programme



These steps may be undertaken consecutively or several activities may be carried out at the same time. For instance, the act of carrying out a situation assessment (described in Module 2) very often simultaneously raises awareness and political interest, which may be one of the objectives described in the action plan. A more in-depth discussion on developing an action plan for a national policy is provided in Schopper (3).

Actions which could be expected from key government agencies and non-governmental stakeholders are summarized in Table 4.3.

4.3.1 Setting programme objectives and targets

A speed management programme has a hierarchy of objectives. A suggested hierarchy of these objectives is shown in Figure 4.5 below, together with sample performance indicators that relate to each level of the hierarchy.

The typical range of potential actions or interventions is shown at the bottom of the triangle – these form the foundation of any speed management action plan. They are implemented to achieve intermediate outcomes or objectives (some examples are shown in the middle level of the triangle) as a clear indicator of progress towards the final outcomes or objectives desired – a reduction in speed related fatal and serious injury crashes (as shown at the top of the triangle).

Figure 4.5 Hierarchy of speed management objectives and performance indicators

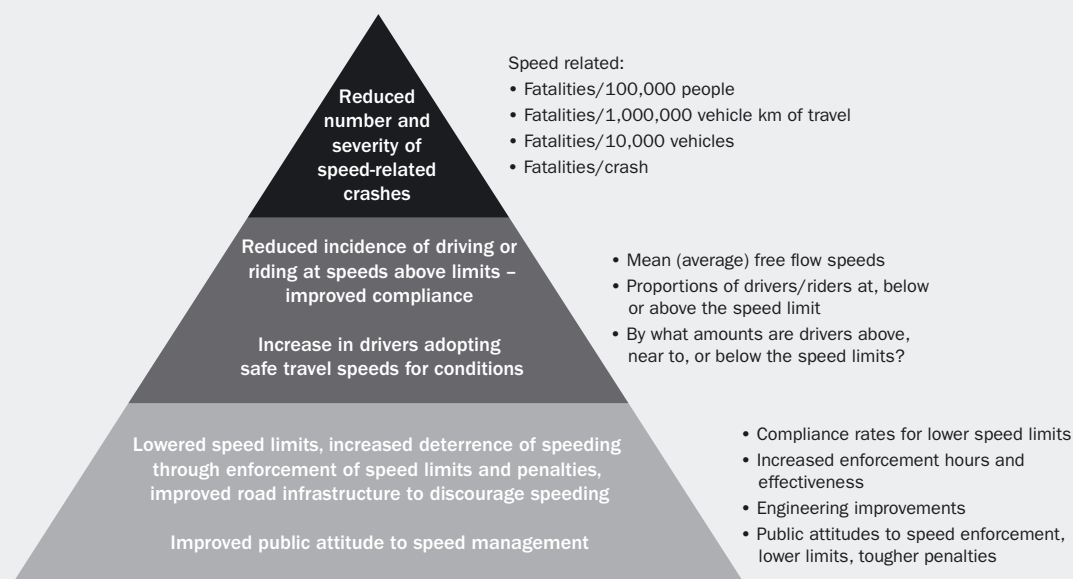


Table 4.3 Examples of typical actions by the different stakeholders involved in speed management

National and local authorities (depending on government structure)	- Decision-makers at various levels have an important role in speed management. They should be as fully informed as possible about its effects, such as the difference between private and social costs, the impact on public acceptability of different speed management strategies and tools, and the fact that popularity is not necessarily a good criterion for sustainable speed management - Transport ministers should work in close cooperation with environment and health ministers, since reducing speed has clear benefits for other sectors as well. - A common vision for a lower impact and more sustainable transport system needs to be developed by national and regional authorities responsible for transport, energy, transport planning, environment, health, justice, education and police, together with, for example, municipal governments, and other departments responsible for land use planning. - National authorities are responsible for setting general speed limits (at national level). In this respect, consideration should be given to a possible harmonisation of general speed limits between countries/regions. - As harmonisation of measures reinforces their credibility with the public, national governments should look at harmonising speed control for similar road types, both at country/state/province level and between countries/states/provinces. - Authorities should develop multi-lateral agreements for controlling the speed of foreign drivers and for the development of long-distance (international) section control for coaches and trucks, and for cars. - Authorities should adopt a pro-active role in better explaining the dangers of speeding and the reasons for speed management measures to the general public.
Local authorities	- Define the function of each road and review existing speed limits; ensure that they are consistent, credible and therefore more easily enforceable. - Develop low-speed zones integrated in the local transport plan. - Ensure there is policy support for speed management measures. As an example, a charter on speed-related issues could be a good way to involve policy makers at local level.
Police authorities/interior ministries	- Ensure that road safety enforcement is closely aligned with speed management policies. - Enforce speed limits in the most effective ways possible, given available resources.
Vehicle industry	- Continue efforts on active and passive vehicle safety. - Propose and promote systems that assist the driver in respecting speed limits. - Forbid promoting or glamorising speed in advertising campaigns.
Technology industry	Research and develop systems that are easy to understand and use (particularly by the elderly) and do not produce adverse consequences.
Insurance	- Become more involved in road safety and take a business approach to investments in the implementation of speed-related policies and operational improvements. - Pursue an incentives-based approach. For instance, promote intelligent speed adaptation, electronic data recorders, or other speed and safety related systems, by reducing premiums for cars equipped with these systems.
Media	- Adopt an educational role to better explain to the public the danger of speed and the benefits of traffic calming, as well as the reasons for speed management measures. - Avoid, directly or indirectly, advocating high-speed driving.
Inter-governmental agencies	- Inter-government agencies (e.g. OECD, ECMT, EU) can play a leading role via conferences, symposia and committees to foster the development and exchange of information and views. These could identify relevant trends and interactions among governments, the public and various industries, including energy, automotive, infrastructure, transport and transport-dependent industries. - Establish an international body or cooperation programme to manage and assure international enforcement of foreign drivers.
Driving instructors	Driving instructors should be well educated on the issues of speed and its effect, and pass the message to learner drivers.
Other stakeholders	Researchers, medical doctors, teachers, professors, parents and family in general also have an important role to play in speed moderation.
Road users	The attitude, behaviour and culture of the road user (whether driver, pedestrian or cyclist) is the key to any successful programme. The success of a speed management programme depends on user acceptance and compliance – whether the acceptance is voluntary or the compliance enforced.

A general objective for implementation of a speed management system might, for example, be stated as decreasing the mean speed or speed variance (getting higher speeds down) by a specified amount on a certain road category, or group of roads, over a given time period.

However, general objectives such as this, whether intermediate or final in nature (as outlined above), need to be considered in a more specific and detailed context to enable the identification and delivery of effective actions. For example, speed management measures in urban areas will usually be quite different to measures implemented in rural areas.

Targets and performance indicators

Adopting targets generally results in more realistic road safety programmes, a better use of public funds and other resources, and greater credibility of those operating the programme (4, 5).

Performance indicators and targets need to be established at the beginning of a programme. These can then be used to focus actions implemented and to track progress.

Developing targets will require the use of crash and injury baseline data in order to establish *measurable objectives*. For example, an activity might aim to reduce the proportion of drivers exceeding the speed limit by 10%, or to reduce the mean speed by 5 km/h at a certain road section on a certain road category over a specified time period. The experiences of other initiatives in road safety suggest that targets should be both ambitious and carried out over a long time period (6).

The working group will develop the scope and nature of the actions they propose to meet their adopted objectives (which are likely to be revised on a number of occasions in the action development process), agree on the tools they plan to use and estimate the extent of implementation that will be feasible based on available funding. From this information a reasonable target calculation can be developed. This may well be an evolving process as better understanding of costs and benefits, and political acceptability of potential measures, are reached by the group and assumptions are reworked.

Once targets are set by the working group, performance indicators that will measure progress towards them need to be agreed. It is important to point out that performance must be measured before the programme starts as a baseline, so that a proper reference is available for ongoing comparison following interventions. Performance indicators are measures that indicate changes, including improvements or deterioration in areas of concern (7) and in baseline data such as:

- the percentage of drivers driving above existing speed limits
- mean speed distribution
- the number and rates of traffic crashes and the resultant deaths and serious injuries.

Performance measures will also be useful to establish measures of exposure, such as use of the road network by vehicles. These enable the estimation of relative risk – such as deaths per million vehicle kilometres of travel (vkm) – but data to quantify this are not always available. Three main methods to collect exposure information can be used at national or local levels and they are:

- traffic counting systems
- travel habit surveys
- amount of fuel sold.

All of these methods can be used to estimate vehicle kilometres of travel.

For each indicator there should be a specific quantifiable target, though they may in some cases be qualitative. In any case, they should be realistic (Table 4.4). Targets should be SMART i.e.:

- **Specific:** well defined and clear to anyone
- **Measurable:** be able to know when the target has been achieved
- **Agreed upon:** have the commitment of all stakeholders
- **Realistic:** can be achieved with available resources
- **Time-based:** trackable to provide an accurate assessment of when the target can be achieved.

4.3.2 Deciding on activities

Having defined overall objectives, targets and initial performance indicators, the group will be in a position to define the actions/activities that are to be pursued. Decisions about what should be done to reduce speed related injury crashes can usefully be based on four general criteria:

- Identification of speed related problems (Module 2)
- What is known about the speed risk factors and what is known to be effective in addressing these? (Modules 3 and 4)
- What are the best tools to use given the nature of the problem and situation? (Modules 3 and 4)
- What realistically can be achieved with the resources available? (Module 4)

The selection and implementation of the appropriate tools will be the basis of the action plan. It is unlikely that a single countermeasure (or tool) will have a dramatic effect on speed related crashes and injury. So an effective speed management action plan will include a number of interventions.

Table 4.4 Example of performance indicators with realistic targets

Objective	Performance indicators	Initial value of indicator*	Target value of indicator*
To decrease speed on a road section with speed limit of 70 km/h	• Mean speed • 85th percentile speed	79 km/h 90 km/h (from surveys)	70 km/h 75 km/h
To reduce the proportion of speeding drivers	• Proportion of drivers exceeding speed limit by 10 km/h • Proportion of drivers exceeding speed limit by 20 km/h	70% 30% (from surveys)	5% 0.1%
To reduce road death and injury	• Crash rate per vehicle and per population involving speed in excess of 10 km/h over the limit • Serious injury rate per vehicle and per population involving speed in excess of 10 km/h over the limit • Fatality rate per vehicle and per population involving speed in excess of 10 km/h over the limit • Fatal consequence involving speed in excess of 10 km/h over the limit	'A'	0.8 'A'
Increase in level of community concern about speeding	• Proportion of population sample survey who identify speeding as a major road safety risk and a community problem	'B'	1.5 'B'
Increase in community support for speed management initiatives	• Level of community support, measured in surveys, for increased enforcement and penalties to deter speeding behaviour	'C'	2 'C'
Increase in drivers and riders acting to change their speeding behaviour	• Number of drivers/riders agreeing not to speed in self-reported surveys	'D'	1.5 'D'
Increase in driver perception of stronger enforcement of speed limits	• Number of drivers/riders surveyed who believe speed enforcement activity is more extensive than before	'E'	3 'E'

* The value of A to E will derive from local situational studies, and the multiplying factor in the last column will be a local judgement.

BOX 4.3: The International Road Assessment Programme and road inspections

The International Road Assessment Programme (iRAP) is active in six continents, ranking roads for safety and promoting countermeasures. Techniques were originally developed and applied in Europe, Australia and the US, and are now used in low and middle-income countries. iRAP is built on three protocols which together highlight relationships between speed, energy, risk and injury.

The protocols involve:

- analysis and mapping of fatal and serious crash rates occurring on major roads (if available)
- performance tracking of particular road sections over time, monitoring the number of fatal and serious crashes over their length (if available)
- drive-through inspections of the safety quality of the road infrastructure in different countries to identify where crashes are likely and the extent to which roads protect road users from crashes, and from death and serious injury when crashes do occur. From these inspections a Road Protection Score (RPS) is derived.

Road inspections instead of crash data

The (RPS) was developed initially to assist understanding of why crash rates vary from one road section to another. It also has applications in those countries where crash information is poor in quality or difficult to obtain. Means of determining priorities that do not require crash data therefore become important.

Roads giving good protection across all permitted speeds therefore score highly. Roads where the crash protection is less good can score acceptably if the speed management regime is tighter. When compliance and enforcement are at low levels, simply setting a low speed limit will not decrease the injury-generating potential of inadequate infrastructure. The RPS produces a score for each route section that enables it to be compared with other sections, and proposes interventions.

See Appendix 5 for more details.

The first step in deciding on activities should be to determine a road hierarchy by road function (Module 3). The theoretical function of most roads will most likely need to be modified to reflect the actual road environment. This careful, detailed consideration of actual road function and presence of vulnerable road users will provide a basis for proposing lower limits on specific parts across the network.

The second recommended step is to focus on crash type and location. Identify the locations or areas across the network that have higher levels of crash risk and where the crashes could most readily be reduced through achievement of lower travel speeds.

As a next step it will be useful to consider what tools could be applied to achieve reductions in these crash types/severities (Table 4.5). The following table is an indicator of likely links between various crash types in urban and rural environments, and the tools that could be expected to be of use in those circumstances.

Table 4.5 Effective tools for reducing different types of crash (examples)

Urban/rural	Crash type	Indicative range of tools that could be used
Urban	Pedestrian and other vulnerable road-user fatal crashes	• Lower speed limits to meet <i>Safe-system</i> levels (30 km/h to avoid fatalities) • Enforcement of those limits • Engineering treatments – well signed and marked pedestrian crossings – humps at pedestrian crossings – gateway treatments at entrances to towns/villages – pedestrian refuges in the centre of multi-lane roads to enable safer crossing
Urban	Intersections – fatal crashes between vehicles	• Lower speed limits at approaches to intersections to meet <i>Safe-system</i> outcomes (50 km/h maximum speed) • Enforcement of those limits • Engineering treatments – platforms/humps at intersections – roundabouts – traffic signals – splitter islands – stop and give way markings and signage
Urban	Run-off-road fatal crashes	• Lower speed limits • Enforcement of those limits • Engineering treatments – locating fixed hazards well back from the edge of the carriageway wherever possible
Rural	Run-off-road crashes (often fatal because of higher travel speeds)	• Lower speed limits to reduce crash likelihood • Some enforcement of limits • Engineering treatments – sealing of shoulders – delineation of the through lanes (edge and centre-line marking) – realignment of high-risk curves – establishing clear zones free of trees, poles and other obstacles (remove, relocate or shield vehicles from obstacles) – hazard markers and advisory speed signs
Rural	Head-on crashes	• Speed limits on two-lane, two-way roads not above 70 km/h • Enforcement of those limits • Tactile centre-line marking and barrier marking • Hazard markers on curves and advisory signs approaching lower radius curves.
Rural	Intersections – fatal crashes between vehicles	• Speed limits on cross roads not above 50 km/h • Speed limits on the major through roads not above 60 km/h at the approaches to a cross intersection • Enforcement of those limits • Engineering measures – construction of offset T-intersections to replace cross roads – warning signs on all approaches – rumble strips on the minor road approaches – ensuring vegetation and other obstacles impeding vision are removed wherever possible
Rural	Pedestrian fatal crashes	• Lower limits at pedestrian crossing locations • Enforcement of those limits • Severe penalties for drivers taking inadequate care and killing or seriously injuring a pedestrian on a clearly marked pedestrian crossing • Engineering measures – basic footpaths off the side of the road – mid-road refuges for crossing pedestrians (at marked crossings)

4.3.3 Choosing and applying tools

The next step is the selection of tools most likely to address the existing problems and have the greatest road safety benefit. Table 4.5 indicates some useful starting points when considering the ways in which relevant tools could be used to greatest effect. If it is a new road, all the tools in Table 4.6 need to be considered, including appropriate road design standards and its classification.

Table 4.6 Maximising the effective use of tools

Tools (Module 3)	Defining the problem (Module 2)	Deciding what to do (Module 4)
Legislation	Reviewing the road rules, legislation and penalties already in place	Consider the ways that laws and sanctions can be strengthened
Enforcement	Assessing the effectiveness of enforcement and (human and equipment) police resources	Developing plans to improve and enhance enforcement effectiveness. This may involve considering new methods, focused strategies, enhanced training or additional equipment
Setting speed limits and speed zones	Reviewing the speed limits and determining if the limits are too high for safe travel	Planning for revisions to speed limits. Determining how best to introduce the revised limits
Signs	Reviewing the road environment to see if there can be a better communication of what the speed limits are, and why they are set at those levels	Deciding on what additional or changed signage is necessary for improvements, or changes in the speed limits or advisory speeds
Engineering changes	Assessing the road environment for opportunities to encourage reduced speeding through engineering modifications. Reviewing the engineering options available	Determining the best options for improving speed management through engineering measures, depending on level of resources available
Public information	Assessing community knowledge and attitudes, and determining what options can be used to improve knowledge and attitudes – or to complement enforcement programmes	Deciding what kinds of communication objectives should be pursued, and how
Vehicles	Assessing the vehicle fleet to determine if there could be improvements to vehicles to reduce speed related crashes	Deciding what to do about regulating or influencing a change to vehicles (design rules, inspections, vehicle safety features or otherwise influencing manufacturers) to enable improved speed management outcomes

Resources for a speed management programme will be limited. This means that the best ‘value for money activities’ (those that provide greatest serious casualty crash reduction per unit of expenditure) need to be identified. This is discussed further in section 4.3.8.

4.3.4 Making decisions about speed limits and signs

Establishing a hierarchy of roads by function, which reflects actual road operating activity, will provide the starting point for review and development of a speed limit framework. Decisions about speed limits should be based on *Safe-system* principles as discussed in Module 1.

NOTE

Systems that account for the vulnerability of the human body

The uncertainty of human behaviour in a complex traffic environment means that it is unrealistic to expect that all crashes can be prevented. However, if greater attention in designing the transport system were given to the tolerance of the human body to injury, there could be substantial benefits. Examples include reducing speed in urban areas, separating cars and pedestrians by providing footpaths, improving the design of car and bus fronts to protect pedestrians, and a well-designed and crash-protective interface between road infrastructure and vehicles.

Source: (8)

There are a range of options for the ways that speed limits can be regulated (Module 3). The most fundamental of these is prescribing a maximum speed that is permitted on each road and road section in the network – for all types of vehicle. Setting these speed limits sets broad parameters for the general speed environment. Within this context, decisions can be made about whether speed limits should also be set for specific road user types and specific place or time conditions. A matrix with considerations for a sample of these is presented below in Table 4.7.

4.3.5 Making decisions about behavioural change programmes

While it may seem ideal to raise people's awareness and encourage voluntary compliance, this is generally not enough. International road safety experience over the past few decades has shown that it is more effective to force a behaviour change through publicity-backed traffic law enforcement measures than simply to conduct campaigns urging people to choose to slow down (9).

Decisions on what tools to use have political and resource implications. Table 4.8 explores the questions raised when making decisions about the approach to behaviour change that should be adopted.

Table 4.7 Considerations about selected speed-limiting options

	Type of limit	Considerations
Default limits	The legislated speed limits that apply (a) in built-up areas and (b) on open roads in rural areas – usually not specifically signed	Should reflect <i>Safe-system</i> principles. Reminder signs at prominent locations to inform the public about the underlying limit(s) are necessary
Specific limits	Signed limits on a section or sections of road	<i>Safe-system</i> principles should underpin limit selection. Clear, legible and regularly placed signs, including repeater signs, are essential if high levels of compliance are to be sought
Young/inexperienced drivers	Licence condition – i.e. learner driver, provisional driver	Young or novice drivers have a much higher crash risk than older and more experienced drivers. They may need more practice at lower speeds until they have gained more experience driving on public roads
Heavy vehicle (truck or bus)	Vehicle registration condition or lower posted speed in certain road and traffic conditions	Trucks and buses exceeding certain weight or mass dimensions can be assigned lower speed limits as a condition of their use on public roads. There may be conditions on road sections, for example with steep grades that would favour a lower travel speed in the interests of safety. Some jurisdictions also limit heavy vehicle speeds to reduce traffic noise and for asset preservation reasons
Vehicles towing other vehicles or trailers	Vehicle/trailer registration or licence condition	Vehicles towing other vehicles or objects may not have the stability required to travel at the general speed limits set for a road section. In this case, consideration can be given to setting a lower speed limit
School and other urban zones	Site-specific limit and may be applied within specific time periods	When there are many child pedestrians around, lower speed limits around schools may need to be established. These can be specific to school starting and finishing times. Similarly at marked places in an urban setting
Road work zones	Site and time specific limits can be applied when road work is being undertaken	To reduce the risk of injury to people working on roads, a work zone can be established with a lower speed limit; often complemented by additional traffic management devices

Table 4.8 Considerations about selected behavioural change programmes

Intervention	Implementation considerations
Licence restrictions (lower speeds for novice drivers or licences for certain types of vehicle use)	• Is there a sound and credible licensing system in place? • Will the police enforce the restricted speeds? Is it practical for police to enforce? • Are there practical ways to identify drivers/riders with restricted licences? • Will the restricted speeds enable safe variances in speeds that are travelled by motor vehicles in traffic? <i>Discussion: If the answer is, or could be, yes to these questions, licence restrictions should be pursued. If not, actions to improve the licensing system and to assist police to develop enforcement practices and preconditions are needed. If the existing traffic environment is not conducive to safe speed variances, actions to separate slower drivers through engineering means may be a better option.</i>
General deterrence (highly visible but unpredictable or randomized speed enforcement)	• Are there sufficient traffic police? • Are the police operations providing effective enforcement? • Can the speed enforcement operations be made visible? • Are the speed enforcement operations random enough to give a sense of anywhere, any time? • Can the operations be backed by positive publicity? <i>Discussion: If the answer is, or could be, yes to these questions, general deterrence is a highly effective speed reduction strategy and should be implemented as a matter of high priority.</i>
Targeted enforcement	• Do the police have the capacity and enough information about where best to target speed enforcement? • Are there road safety reasons for targeting enforcement? • Is there a determined effort to enforce speed regulations? • Will the judicial, political and cultural systems support prosecutions? • Can the interventions be evaluated? <i>Discussion: If the answer is, or could be, yes to these questions, a targeted enforcement programme should be put in place. Note that a combination of general and specific deterrence through issuing penalties for speeding offences is ideal. The idea is that people will be convinced by knowing that they can get caught and penalized for speeding, and that they are reminded that this can happen anywhere and at any time.</i>
Speed cameras (mobile and fixed)	• Are there funds for purchasing necessary equipment/resources? • Are the police willing and trained to use the equipment? • Can the infringement processing system be upgraded to process camera infringements quickly and efficiently? • Is there political and community support for speed camera enforcement? • In the case of fixed cameras, can these be supplemented with mobile patrols and other strategies to ensure compliance across the whole of the network? • Do accurate and readily accessible data systems exist for licensing and vehicle registration? • Can sufficient legislation be put in place to assure successful prosecutions? • Is there owner onus or other supporting legislation/technology so that the driver can be identified and tracked? <i>Discussion: If the answer to all of these questions is yes, speed cameras should be introduced. This is a very powerful tool for speed management. The right balance between fixed/stationary and mobile camera operations must be determined based on enforcement intelligence and crash analysis. The best technology might depend on which category of vehicles are the 'target' group.</i>
Increased penalties or sanctions	• Is the elected government willing to toughen the penalties for speeding offences? • Will the police provide rigorous enforcement for speeds with higher penalties? • Will the courts provide consistency in prosecutions? • Are there practical enforcement strategies for prosecuting unlicensed, cancelled, suspended or disqualified drivers who continue to drive? • Are the penalties equitable and sufficient to deter both poor and wealthier drivers? <i>Discussion: Penalties must be in place to ensure that people will be deterred from speeding, otherwise enforcement has little value. If widespread licence loss is a likely outcome of increasing penalties there may be an increase in unlicensed driving. If monetary penalties only are relied upon, there may be a tendency for the penalties to be a lesser deterrent for wealthier drivers, and may be unfair to poor drivers who may be under pressure to speed in work-related tasks.</i>

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Intervention	Implementation considerations
Social marketing	• Are there sufficient funds/resources to mount an effective campaign? • Is there a need to persuade people/groups to support actions? • Is there a clear message and target audience? • Does the jurisdiction have sufficient communications and creative skills to produce effective campaigns? <i>Discussion: Social marketing can be an effective tool in gaining the necessary community support for speed management. But this activity alone is unlikely to achieve individual behaviour change or speed crash reduction. It is useful to consider social marketing that targets particular groups, for example professional drivers – working through their employers</i>
Public and school-based education	• Are there specific things the public need to know in order to help them comply with safe and legal speeds? • Is the information likely to be well received by the audience? • Is school-based education complemented with parent education? • Will a greater understanding of the speed risks lead to greater support for speed management? <i>Discussion: Educating the public over time will assist an understanding of the speeding problem and ultimately help to deepen community resolve to reduce it. However, it will take a long time to achieve and must be complemented by other, more immediate interventions to change behaviour.</i>
Enforcement publicity	• If advertising messages tell people that the police are enforcing speed, will this be evident by effective police patrols, vehicle interceptions and other enforcement strategies? • Are there sufficient resources or funds to conduct a media campaign? <i>Discussion: The use of media advertising and other media messages have been found to boost the perception by drivers of the likelihood of being detected and booked for speeding offences. This is the most important use of media in speed management.</i>
Fleet safety legislation	• Are the requirements of proposed legislation fair and reasonable? • Are the requirements enforceable? • Have the interested stakeholders been consulted? <i>Discussion: Speeding is one of the most prevalent risks in work-related driving. Requiring employers to take some responsibility for safe driving by their employees can be an effective tool for reducing the pressure on employees to speed.</i>

4.3.6 Making decisions about engineering treatments

There are a number of factors to consider when deciding on which engineering treatments to consider as part of a speed management programme. Treatments can be used either at specific locations (i.e. at a site that has inappropriately high vehicle speeds), or as part of a more integrated approach to speed management across a road network.



The expected crash reduction plays a major part in decisions regarding treatment selection. There is information available on the expected reduction in crashes for a variety of road safety treatments (10), (11). However, considerations such as the overall cost and cost effectiveness of treatments will also need to be considered. When

deciding on the most appropriate treatment type, and the locations that should be treated first, an economic analysis should be performed to determine where the greatest gain can be made for the budget available (12).

Expected speed and injury reduction, cost and cost effectiveness are typically the most important issues to consider, but effect on traffic flow, environmental and health, public and political acceptability, feasibility, available skills and current legal environment can also affect the decision.

Examples of some considerations for specific engineering-based treatments are provided in Table 4.9.

Table 4.9 Considerations about selected engineering treatments

Installation of speed humps	• Cost and expected crash reduction • Effect on traffic flow – are there alternative safe routes available for traffic; is this a bus route, or one used by emergency vehicles? • Effect on vehicle condition – humps can damage suspension if poorly designed • Are there adequate materials available to construct a high-quality facility? • Have local residents been consulted about placement of speed humps? <i>Discussion: The use of speed humps needs to balance their effectiveness in slowing traffic with the effects upon emergency and heavy vehicles. However the use of carefully designed humps or platforms which enable a safe speed can address many of these concerns.</i>
Signs to address problems at curves	• Are there defects with the road that should also be addressed at the site (e.g. improvements in poor surface-skid resistance; widening of the road shoulder)? • Is there adequate space to provide the signs in advance of the curve (i.e. is there a location where the signs will not be obscured by roadside objects; is there enough distance between the sign and the curve for drivers to respond)? • Has an assessment been made of the entire route to make signing of curves consistent? • Will the signposts pose a hazard to drivers? <i>Discussion: Consistency of the warnings given to drivers and riders along a route is important to avoid increasing risk.</i>
Roundabouts	• Cost and expected crash reduction • Is selection of a roundabout appropriate for all road users (e.g. cyclists have problems safely negotiating roundabouts with two or more lanes; small roundabouts may provide restrictions for larger vehicles, including trucks, buses and emergency vehicles)? • Is there enough road space available to construct the roundabout or will expensive or protracted land acquisition jeopardize the cost effectiveness or the delivery within an acceptable timeframe? <i>Discussion: Roundabouts are unlikely to reduce the number of crashes at an intersection, but they will substantially reduce the number of serious casualty crashes at the intersection.</i>
Pedestrian and bicycle segregation from motorized traffic	• Cost issues and volumes of pedestrian traffic will assist decisions about which options to choose • Type of road environment and existing road and roadside activities • Is there enough space for tunnel or bridge construction? • Will the types of barriers available be sufficient to reduce the potential for harmful collisions? <i>Discussion: Separating motorized traffic from vulnerable road users, especially in environments where motor vehicles travel at speeds that human bodies cannot withstand without serious injury, is an important principle.</i>

4.3.7 Ensuring an appropriate medical response

The primary prevention of death and injury caused by speeding is an overriding priority. However, if a crash occurs, many lives can also be saved through proper trauma care. This is especially the case in developing countries, where there are high fatality rates from potentially repairable injuries.



BOX 4.4: Ensuring emergency medical services are prepared

Setting up an EMS system may not be feasible for many countries, but alternative pre-hospital care arrangements can be developed.

Trauma care, in both pre-hospital and hospital settings, requires speedy and appropriate action by trained personnel, with proper supplies and equipment. Improving trauma systems has been shown to lower the mortality in all treated trauma patients by between 15% and 20%, and to cut the number of preventable deaths by more than 50%.

Several recent publications provide technical details of on how to improve trauma care. Two, published by WHO, are strongly recommended: *Guidelines for essential trauma care* (13) and *Pre-hospital trauma care systems* (14).

Pre-hospital care

The pre-hospital stage is an important one to target in efforts to cut the number of road traffic deaths. The care given will depend on the services that exist.

Situations where no formal emergency medical service exists

A “formal” system of emergency medical services (EMS) is usually one with ambulances and trained personnel, who work in an agency with some supervision and with a network of communications. Where no formal EMS exists, governments should make alternative arrangements to provide pre-hospital care. Ways can be found to build on existing, informal systems and harness community resources, such as training members of the public in basic first aid. Setting up formal EMS systems in urban areas and along major inter-urban roadways should also be explored. Cost should be one consideration, given the high cost of these systems.

Strengthening existing EMS systems

Many EMS systems could be strengthened in a number of ways, for example, by establishing a regulatory

agency to promote minimum standards for the delivery of prompt, quality and equitable pre-hospital care. They can also be strengthened by streamlining communication between sites where calls are received (such as alarm centres) and the sites of ambulance dispatch, as well as between different ambulance services; and by keeping good records on people cared for by the EMS, so as to monitor and improve the quality of care.

Essential trauma care

Improvements in trauma care need not necessarily involve high-cost, high-technology equipment. Much can be accomplished in an affordable and sustainable way through better planning and organization.

The essential trauma care services and the resources required for them can be promoted in several ways, including through needs assessments of trauma care requirements, through training in trauma care provided in appropriate educational settings, through quality improvement programmes that consider the entire trauma facility setting, and through the inspection of trauma facilities (13).

Rehabilitation

Many of those who survive injury go on to develop physical disabilities that limit their physical functions. Tragically, many of these consequences are avoidable and can be reduced through better rehabilitation services. Rehabilitation services are an essential element of trauma care, and can be improved by conducting in-depth needs assessments for injury-related rehabilitation and by strengthening national rehabilitation programmes. They can also be improved by incorporating the recommendations of World Health Assembly Resolution WHA58.23 and the recommendations on rehabilitation in the *Guidelines for Essential Trauma Care* (13) into a country's health policy.

4.3.8 Estimating required resources

Having worked out the activities in detail, the working group can now estimate the resource requirements and costs of each of them, and in the process draw up a budget based on quotes from suppliers or on the costs of recent, similar undertakings. The resources necessary will vary depending on the different tools. Engineering treatments, for example, are usually substantially more expensive to set up than enforcement, education or speed limit initiatives, but might be the best value for money in the longer term.

When formulating budgets for the project, the following actions are recommended:

- estimate the funds that will be required for the duration of the project
- set priorities, with activities phased if necessary to ensure that priority activities receive adequate funding
- obtain information from government departments in other countries about similar projects and their costs
- estimate the likely administrative and operational expenses for implementation
- estimate the costs of monitoring and evaluation
- estimate the costs of training
- plan for financial and performance reports to be made at regular intervals
- estimate the costs of information campaigns.

The recommended method of costing the programme is the ‘marginal cost method’. This should include:

- the added costs of additional police, relevant training or new equipment and its operation, calibration and maintenance
- additional back-office costs for processing increased numbers of infringements and maintaining a high level of efficiency
- engineering treatment costs, including new signage and line marking
- publicity campaign costs.

The nature of some typical resource costs is summarized in Table 4.10.

Table 4.10 Resource needs and nature of costs involved

	Resource needed	Type of costs involved
Legislation	• Definition of legislative or administrative change • Skilled legislative writers • Political support • Law enforcement advice • Penalty setting advice and recommendation • Sound licensing system	• Staff/skills (occasional) • Staff/skills (occasional) • Staff/skills (recurrent) • Time/consultation (occasional) • Staff/skills (occasional) • Staff/system upgrades (recurrent and capital funding)
Enforcement	• Police officers • Enhanced training for professional development • Equipment	• Staff/skills (recurrent) • Funds for purchase and time • Capital funds, and recurrent calibration and maintenance
Setting speed limits and speed zones	• Skilled traffic engineers • Consultative staff	• Staff/skills (occasional) • Staff/skills (occasional)
Signs and markings	• Signs and paint	• Capital funds (initial and recurrent for maintenance)
Engineering changes	• Traffic engineers • Materials for road changes	• Staff/skills (recurrent) • Capital (long term and recurrent for maintenance)
Public information	• Behavioural scientists • Marketing specialists • Communication materials • Media	• Staff/skills (recurrent) • Staff/skills (recurrent) • Funds for purchase • Funds for purchase
Evaluation	• Social scientists, engineers and statisticians • Researchers	• Staff/skills (recurrent) • Funds for purchase (occasional)

Table 4.11 presents a summary of a number of elements that could be included in a speed management programme. They are rated on the basis of effectiveness, ease of implementation, cost, and whether there is research to demonstrate the effectiveness of the interventions. There is also reference to where more information can be found in this manual for each element.

A team of well-trained, multidisciplinary professionals is needed to implement the action plan. The team ideally will have a mix of skills, including engineering, social and behaviour science, law enforcement, political, managerial and marketing, data collection and statistical analysis skills. Professional development will need to be considered (well in advance of implementation) for all points of the delivery chain.

Table 4.11 Possible programme elements, by priority, for countries implementing a speed management programme

Element	Description	Research	Effectiveness	Difficulty to undertake	Cost to implement	Section in this manual
High Priority	Road safety/crash data assessment	Yes	High	Low	Low	2
	Define road hierarchies – rural and urban	Yes	High	Medium	Low	3.1.1
	Speed limit setting	Yes	High	Medium	Low	3.1.2
	Speed limit signage and informing the public	Yes	High	Low	Medium	3.1.3
	Enforcement of speed limits	Yes	High	Low	Medium	3.2.2
	Penalties, including fines and licence loss	Yes	High	Low	Low	3.2.3
	Public education with enforcement messages	Yes	High (if linked to enforcement)	Low	Medium	3.3.2
	Engineering treatments to slow traffic	Yes	High	Medium	Medium to high	3.4.1
	Engineering treatments to separate vulnerable road users	Yes	High to medium	Low	Medium to high	3.4.2
	Medical trauma response systems	Yes	High	Medium	High	4.3.7
	Prepare an action plan for speed management	Some	High to medium	Medium	Low	4.3
	Monitoring and evaluation	Yes	High	Medium to low	Low	5

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Element	Description	Research	Effectiveness	Difficulty to undertake	Cost to implement	Section in this manual
Medium Priority	Speed camera enforcement	Yes	High	Medium	Medium	3.2.2
	Graduated licensing speed restrictions	Yes	Medium	Medium (can be enforcement difficulties)	Low	3.3.5
	Social marketing and public education	Some	Medium	Medium	Medium	3.3.1
	Legislating for employer responsibility	Little	Medium	Low	Low	3.6
	Speed advisory signage	Some	Low	Low	Medium	3.1.3
	Set up a reference group for consultations	Some	Medium	Medium	Low	4.2.2
Low Priority	Promote new vehicle speed control technologies	Yes	Medium	Medium	Low (to promote) High (to implement)	3.5
	Community programmes	Some	Low	Low	Low	3.3.4
	School education	Some	Low	Low	Low	3.3.6
	Incentives	Some	Low	Low	Low	3.3.3

4.4 Preparing for implementation

After gaining government endorsement for the proposed programme it will be necessary to review how the programme will be delivered (through legislation, enforcement, revised speed limit signage, engineering measures and public education) and the estimated funding requirements.

It may also be beneficial to look at the experience of other countries, and carry out a final check that project objectives, stakeholder commitments and funding are realistic.

4.4.1 Legislative requirements and timing

The legislative change procedures will vary from country to country but this process can take a significant amount of time. Depending on the substance of the change, it may be a simple administrative procedure for one ministry to enact. In other cases it may involve a process of discussion and debate within the legislative branch of government.

Preparing the political arm of government for legislative change, whether new rules or new penalties are proposed, requires the working group or one of its members to write a briefing document that contains:

- objectives of the proposed change(s)
- coverage or lack of coverage in other related legislation
- the reason for the proposed change(s)
- how mechanisms for enforcing and administering the legislation will be put in place
- how the community will benefit from the change(s)
- likely level of community support for the change
- the proposed timeframe for the legislation to take effect.

People with skills in drafting legislation will need to be assigned to write the change(s) in accordance with the intentions of the initiative, and the practicality of implementing the legislation. Police in particular need to be confident about the enforceability of the legislation and regulations before committing to an implementation timeframe.

4.4.2 Enforcement requirements

In order to be effective, road rules, laws and regulations require effective enforcement (Box 4.5). While simply the announcement of a new law can sometimes result in behaviour change, sustainable and meaningful change invariably depends on forcing compliance with the law through the real threat and public awareness of penalties for non-compliance. Preparation for effective enforcement should take into account police and judicial capabilities and attitudes towards the enforcement and

prosecution of offenders, and the community driving culture, as well as ensuring that the resources, technology and tools needed for this process are available.

BOX 4.5 Administration of enforcement

Back-office processing of infringements

Planning for capacity to process increased numbers of infringements, as a result of a tougher and expanded enforcement strategy, needs to take place. Where automated enforcement is to be introduced, the processing volumes (including peaks and troughs) are likely to be substantial and thought needs to be given to the volume and rate of infringements likely to be issued.

Follow-up arrangements for unpaid fines

Planning for capacity to carry out follow-up of unpaid fines is an essential part of enforcement support. If the public believe that fines will not be pursued by the authorities, or sanctions not imposed, the deterrent effect of the speed enforcement programme will be undermined. Arrangements need to be put in place to avoid this impression being created as the enforcement effort expands.

Police culture/capacity

If speeding laws are to be effective, traffic police must be well trained, committed and have real capacity to provide effective enforcement (Box 4.6). It may be necessary to educate all police officers of the importance of speed law enforcement (not just traffic police) and to mount an ‘internal campaign’ to convince them that – in terms of injury risk – speeding is as critical a matter as robbery or homicide. In addition all police must set an example by their driving behaviour which will always be subject to community scrutiny.



BOX 4.6 Training of police officers in speed enforcement

Police officers must be trained in effective strategies and tactics to achieve maximum success. This includes:

- knowledge of the law
- understanding how speeding increases the risk of crashes occurring and the severity of crash outcome
- police officers on and off duty obeying speed limits and setting an example
- understanding how to set up speed monitoring strategies for maximum public exposure and enforcement with hand-held devices, mobile speed cameras or vehicle-mounted devices
- how to target locations with higher rates of non-compliance
- how to provide effective advice and education on speeding to drivers
- understanding the impact of crash risk on financial and human resources in the community
- publicising the savings for police, emergency services and hospitals of an effective speed programme
- understanding the best ways to measure the effectiveness of their enforcement intervention
- educational lectures, as well as individual and media warnings.

See Appendix 6 for more details about police and traffic enforcement practices.

4.4.3 Revised speed limit signs

Installing signs to clarify existing speed limits, or altered signs for locations where revised speed limits are to apply, is a major exercise if implemented consistently across the country.

For this to happen, supplies of signs with a consistent design must be purchased or produced. The timing of installation may depend on the availability of local teams to carry out the work. Care should be taken to ensure that signs are clearly visible to approaching road users and especially that they are effectively maintained and not obscured by foliage or other signs.

Information signs about default limits applying (the limit that applies when there are no speed limit signs) in urban and in rural areas are also likely to be needed. The timetable for installing these would have to be planned in accordance with the timetable for any necessary legislation.

4.4.4 Engineering measures

Implementation of engineering measures usually requires substantial lead time in order to:

- obtain resources, usually as part of the annual, government road authority budgeting cycle
- obtain necessary designs
- obtain planning and environmental approvals
- award contracts
- carry out works.

In a large number of instances, works involved – such as line marking and signs – are relatively minor and could be funded by existing annual budgets and have shorter lead times. However, timing needs to be carefully considered, and implementation should not start before the timelines are reliably estimated and agreed.

This scheduling and progress of necessary infrastructure works and treatments need to be monitored by the working group. The locations where speed compliance will bring greatest returns should be prioritized. In addition, the decision to proceed with revised speed limits and enforcement ahead of the engineering works may be taken where the problem location has a high rate of speed related casualty crashes.

Try to use all opportunities possible to inform the public that the purpose of the particular project is to support the national speed management programme. Consistent project signage themes will brand the programme and assist public awareness of its existence.

4.5 Informing, influencing and involving the public

There are three distinct objectives for public communications about speed management.

- Advising and educating drivers and other road users about speed management actions and the change in behaviour expected of them.
- Motivating compliance with speed limits and safe speeds.
- Encouraging public support for actions to address the speeding problem (Box 4.7).

BOX 4.7 Basic steps for implementing a speed management public awareness campaign

1. Write a background paper on the problem to be addressed, including information about the actions being implemented to deal with it.
2. Write a communications brief with clear objectives for behaviour change, including information about primary and secondary audiences for the communication, timing and duration, budget and any other relevant information.
3. Engage a creative agency or agencies (advertising, public relations and marketing specialists) and give them the briefing information.
4. Seek options for creative communications that would meet the brief (at least 3).
5. Test the creative concepts with a sample audience. Market research companies are well equipped to carry out this 'focus group' research.
6. Decide on which communication concepts and strategy to follow.
7. Schedule the campaign communications in consultation with the working group to coordinate with other relevant actions.
8. Produce the creative materials (e.g. advertisements and other communication materials).
9. Launch the campaign – this can be a media event involving political or community leaders.
10. Implement the communications programme.

4.5.1 Working with the media

The media – including the print media, the broadcast media and the internet – serve various functions in a public education campaign. As mentioned earlier, media outlets may be interested in and cover the campaign itself – its objectives, strategies and progress. They may support it, but they may also be critical, even to the extent of running a counter-campaign.

It is therefore important that the reasons for the campaign are set out clearly and backed by evidence. It could be demonstrated, for example, that while speeding above the limit by even a small amount may save tiny amounts of time, it increases the risks of fatal or serious injuries substantially. Remember that the media like to use statistical data if it is available.

The media are also frequently keen to publicize statements from medical personalities, political leaders or the police on traffic safety issues in general. This

could include the value of speed compliance, but it will require extensive briefing of the media to convey to them the facts about speed and crash risks.

A continuing part of the campaign should be to keep the media regularly informed about its progress and how it is meeting its targets. This can be done either by the government agency or by an external public relations agency.

4.5.2 Planning the campaign roll-out

The initial public education stage, before rigorous enforcement gets underway, should be no more than six months in duration, since the initial impact of a campaign that goes on any longer will begin to fade. The date set for the introduction of, for example, the new enforcement arrangements should be one that is easily remembered.

The enforcement publicity stage can have a considerable effect on behaviour, and needs to be continued until its planned outcomes are achieved. However, marketing efforts need not be continuous. Periodic marketing will reinforce a message, and is more cost-effective than continuous marketing. During this stage, it may be best to enforce the speed compliance with warnings only at first, though the campaign will become most effective when the limits are fully enforced.

4.5.3 Carrying out the campaign

Depending upon the budget, objectives and target audiences for the campaign, a range of media will usually be employed to convey its messages. Some media are more appropriate than others for a particular target group; newspapers may be better for middle-aged people, for example, cinema advertisements for younger people and radio for those in rural areas. Roadside advertisements are effective and provide economical, on-the-spot advice to a road user target audience. An experienced advertising agency will be able to advise on the best way to reach different target groups.

4.6 Planning and using pilot projects

Pilot projects are good for assessing speed management methods to see how they work best. Pilots should be substantial enough in scope to enable impacts to be measurable but should not be so large that they introduce the problems of scale associated with a full roll-out.

4.6.1 What is a pilot project?

A pilot project is a limited implementation of an initiative aimed at testing and evaluating its effectiveness on a small scale before implementing more widely.

Some pilot projects will be limited to one or two components of a proposed speed management programme while others may combine public information, engineering works, speed limit review and improved limit signage and speed enforcement – all the elements of a speed management programme.

4.6.2 What are the benefits?

Pilot projects can test a range of implementation aspects, including operational practicalities, community reaction, likely outcomes, and technical feasibility. Pilot projects can be an effective means of developing knowledge and skills for joint agency cooperation for effective delivery. Political support can often be achieved more readily if a pilot approach is to be used. Government agencies often feel less ‘locked in’ to a particular approach if a pilot approach is used.

Pilot projects can also assist to sell the benefits of an initiative to the community or to government. If the results of a limited trial show reductions in injury, this can provide strong evidence that full implementation will achieve substantial benefits.

Importantly, pilot trials will identify any problems with specific interventions that need to be rectified prior to full implementation.

4.6.3 How to plan and implement a pilot project

The steps to be followed are the same as those which would be used in a full-scale implementation. The geographic scope is much smaller and the number of elements may be limited. The project should be promoted as a pilot to prepare people for any unforeseen issues that may arise. It is always useful to be open with the public and tell them if a particular outcome emerges that was not anticipated, and that future programmes will be modified to reflect what has been learned.

The pilot projects should be evaluated in accordance with methods outlined in Module 5. If the pilot evaluation indicates substantial problems, it may be worthwhile to conduct a second pilot test using a different approach and evaluate this prior to full implementation.

Pilot testing can be conducted at a number of levels and for a range of interventions. At a simple level, campaign messages or speed signage can be tested with small groups of a sample target audience. But more complex programmes can be conducted on a limited basis – as pilot projects – and evaluated prior to full-scale implementation.

Usually the information collected (or test indicators) will be of the same type as used for the longer term monitoring and evaluation. The pilot testing should be designed to provide confidence that the main programme will be fully effective. It is therefore likely that both qualitative and quantitative measurements will be required, as well as obtaining feedback from those involved in conducting the programme.

Test indicators can include such things as:

- outcome data such as crash incidence and severity.
- impact data such as:
 - reductions in mean speeds
 - improved compliance with speed limits
 - increased public support for speed enforcement.
- process feedback such as:
 - stakeholder satisfaction with the intervention process.

The pilot project also offers the opportunity to clarify the inputs required, and point to possible improvements to implementation actions.



CASE STUDY: Increased penalties for speeding

Demerit points for speeding offences were doubled in the state of New South Wales, Australia over a holiday period. The motoring association surveyed its members, finding broad support for this initiative. Speed related injury crashes were lower than they had been in previous holiday periods and police detected fewer offences during the trial. Following these results, the legislation was extended to cover all holiday periods on a continuing basis.

Reporting and using test results

If the pre-testing indicates deficiencies in either implementation or the programme itself, stakeholders should be informed and involved in deciding on any changes required in the large-scale programme. If the pilot evaluation indicates substantial problems, these should be reported and discussed with all stakeholders before conducting further pilot testing (which may involve using a different approach) that will need to be fully pilot tested prior to full implementation.

Pilot projects can help sell the benefits of an initiative to the community or to politicians. If the results of a limited trial show reductions in injury, this can provide strong evidence that full implementation will achieve substantial benefits.



CASE STUDY: **Trial of 40 km/h around school buses in New South Wales**

A trial of reduced speed limits around buses during school travel times was tested in New South Wales in 1999. This involved installing flashing lights and a '40 km/h' sign on the back of buses. When this was tested with road authority officers measuring speeds on a road with a normal speed limit of 80 km/h, some unsafe sudden braking by heavy trucks was observed as the buses stopped and flashing lights (indicating that the speed limit around the bus was 40 km/h) were activated. As a result, the bus stops on higher speed roads were modified to enable more lead-up warning of bus stops ahead, and more gradual speed adjustment phases for approaching vehicles.

Summary

- Speed management is a highly contentious issue. Political support is essential for a successful programme.
- Political and community leaders must be informed and actively encouraged to support the speed management programme at the outset. Without this support substantial change is unlikely to occur.
- Stakeholders are a mix of those who hold responsibilities for speed management and those with a strong interest in speed management. Roles and mechanisms for involving stakeholders are important elements of managing programmes that address speed.
- A working group, supported by an advisory or reference group, should be established to coordinate actions for best results.
- It is important that good communication and leadership are applied to steering the speed management working group.
- An action plan should set ambitious but achievable objectives, targets and performance indicators.
- Development of activities to deliver the action plan using selected tools requires understanding of crash issues, and the acceptability of certain actions to government and the community.
- An effective action plan will include a range of activities and measures. Single actions are unlikely to have much effect.
- Before implementation it is necessary to conduct a final assessment of the steps to be followed, and confirm that the proposed delivery arrangements will maximize the likelihood of success. Resources need to be secured to implement the plan.
- Communication campaigns inform the public of speed management initiatives, enhance the effectiveness of speed management measures and foster public support.
- Conducting limited trials or pilot projects is good practice as a preliminary phase of programme implementation.

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