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IMPLEMENTATION OF NATIONAL SAFE SYSTEM POLICIES: A CHALLENGE

TECHNICAL COMMITTEE C.1 *NATIONAL ROAD SAFETY POLICIES AND PROGRAMS*

STATEMENTS

The World Road Association (PIARC) is a nonprofit organisation established in 1909 to improve international co-operation and to foster progress in the field of roads and road transport.

The study that is the subject of this report was defined in the PIARC Strategic Plan 2016– 2019 and approved by the Council of the World Road Association, whose members are representatives of the member national governments. The members of the Technical Committee responsible for this report were nominated by the member national governments for their special competences.

Any opinions, findings, conclusions and recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of their parent organisations or agencies.

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World Road Association (PIARC)
Arche Sud 5° niveau
92055 La Défense CEDEX, FRANCE

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TECHNICAL COMMITTEE C.1 ***NATIONAL ROAD SAFETY POLICIES AND PROGRAMS***

AUTHORS/ ACKNOWLEDGEMENTS

This report has been prepared by the Technical Committee C.1 National Road Safety Policies and Programs (2016-2019). The work is based on a survey of 31 national government agencies to capture current practice in the application of safe road infrastructure. The questionnaire includes progress in relation to national legislation, policies, road safety strategies, safety management systems, road infrastructure funding regimes and initiatives focussed on Safe System outcomes.

The main contributors to the preparation of this report are presented below in alphabetical order:

- Blair Turner (Australia) – Co-leader of the Working Group
- Paul de Leur (Canada) – Co-leader of the Working Group
- Ana Tomaz (Portugal)
- Erin Kenley (USA)
- Karen Scurry (USA)
- Rob McInerney (United Kingdom)
- Ruggero Ceci (Sweden)
- Tidiani Diabate (Mali)

The editors of the report are:

- Blair Turner (Australia) – Co-leader of the Working Group
- Paul de Leur (Canada) – Co-leader of the Working Group
- Ana Tomaz (Portugal)

Final review and quality control of the English version of the report by:

- Jean Francois Corté, Strategic Theme Coordinator
- Patrick Mallejacq, PIARC General Secretariat

The French version of the report was reviewed by Tidiani Diabate and Laurent Carnis; the Spanish version of the report was reviewed by Jesus Maria Leal and Juan Emilio Rodriguez.

PIARC Technical Committee C.1 National Road Safety Policies and Programs (2016-2019) chairman and secretariat are:

- Chair: Roberto ARDITI (Italy)
- English-speaking Secretary: Rob MCINERNEY (United Kingdom)
- French-speaking Secretary: Laurent CARNIS (France)
- Spanish-speaking Secretary: Juan Emilio RODRIGUEZ (Argentina)

The questionnaire responses and report analysis were provided by participants that are not necessarily providing the official answer of own PIARC national committee. Moreover some of those participants may not have been part of the PIARC organization.

The national representatives who provided the response to the questionnaires are listed in Appendix 2. This report could not be realized without their contribution and the authors of this report acknowledge their valuable participation. The responses provided are based on knowledge available to these representatives at the time of the survey, and may not reflect the complete

situation in any given country. It should also be noted that there may be state/province local practices that vary from the national response provided.

EXECUTIVE SUMMARY

2019R39EN

IMPLEMENTATION OF NATIONAL SAFE SYSTEM POLICIES: A CHALLENGE

The Safe System approach has been recognized by the United Nations and other international bodies as a critical component of improving road safety. The PIARC Road Safety Manual outlines the key elements of the Safe System approach and reinforces the Safe System principles (see this chapter: https://roadsafety.piarc.org/en/road-safety-management/safe-system-approach).

This report provides a contribution to global road safety through a summary of National Safe System Policies and Implementation in relation to the Safe System approach. The report also highlights the steps that low, middle and high-income countries alike can take to accelerate progress towards Safe System outcomes. The report includes a number of key findings from a review and survey of international practice related to national Safe System policies and implementation, which are listed below and expanded further in the body of the report. The focus of this report is related to infrastructure road safety elements, with limited focus on the institutional arrangements and management of safety. It should be understood that successful Safe System approach involves more than infrastructure actions, recognizing the need for a hositic approach that encompasses education, enforcement, management and institutional procedures in support of collision reduction and prevention.

There are some major challenges and significant barriers that road agencies still face when attempting to implement Safe System policies. Policy challenges include support and funding, guidance and information. Management challenges included coordination and availability of skilled staff, lack of crash data and knowledge of the road state/condition.

It is encouraging that knowledge regarding the Safe System is relatively high, and many countries have now adopted this approach. However, only a third of respondents to this survey indicated that their countries had successfully implemented a Safe System approach. In regards to Safe System infrastructure, only half of the surveyed countries reported that they had successfully implemented specific targets at national level, while others indicated that such targets were embedded in other strategic plans.

Speed management, including the setting of appropriate speed limits is a key element of a Safe System for roads, and information is provided on currently adopted speed limits in the surveyed countries.

The vast majority of countries have set road safety targets, although in many cases (around half of these surveyed) there were no specific targets relating to the provision of safe road infrastructure. The use of targeted Key Performance Indicators (KPI's) to assist in setting ambitious road safety targets and track progress towards these is increasingly recognised as an important element of managing road safety, including KPIs for infrastructure. Further advice is required for road agencies regarding effective infrastructure KPI's with examples provided within this report providing a useful starting point.

EXECUTIVE SUMMARY

Most countries have methods to prioritise road safety investments, and similarly, most use multiple methods. The most commonly used approach is Benefit-Cost Ratio, but Potential for Improvement, Cost Effectiveness and Crash Rates are also commonly used.

In regards to effective road safety solutions to address common crash types, the majority of countries had policies, strategies and actions to address these. However, around a third of countries did not have such activities to address the key crash types of head-on, run-off-road, intersection, and vulnerable road user crashes. Many countries also lacked effective strategies to address speed related crashes. This report contains a wide selection of treatment options that support other PIARC guidance on this topic (e.g. PIARC, 2009). Similarly, different policies, strategies and actions were in place to address different road user groups with examples provided within this report. This information will be of interest to those countries wishing to develop strategies to address risk for these road users.

One third of respondents indicated that they had not yet started implementing a Safe System approach, or that they had just started. Many of these were low and middle income countries (LMIC) , but there were also several high income countries (HIC) included.

There was a reasonable level of understanding of the key principles of a Safe System approach, although there is still room for improvement in understanding.

The results from this survey represent current activity in a wide variety of countries, including those in LMICs and HICs. All countries are encouraged to benchmark their own road safety activity against the actions undertaken by those contributing to this survey. All countries stand to gain some improved knowledge by assessing the policies and activities that will lead them to greater Safe System implementation.

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1. INTRODUCTION

The United Nations, in their Sustainable Development Goals (SDGs), have set the target of reducing global road fatalities and serious injuries by 50% by 2020, compared to 2010 levels (Goal 3.6). The United Nations SDG Goal 11.2 also outlines targets for safe and sustainable cities with a specific focus on the safety needs of vulnerable road users.

Goal 3.6 – By 2020, halve the number of global deaths and injuries from road traffic accidents

Goal 9.1 - Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Goal 11.2 – By 2030, Provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding prublic transport with special attention to the needs of those in vulnerable situations, women, shildren, persons with disabilities and older persons.

1.1. ROAD SAFETY AND THE SAFE SYSTEM

The Safe System approach recognizes that death and injury are unacceptable and are avoidable. This approach seeks to ensure that no road user is subject to kinetic energy exchange in a crash which will result in death or serious long-term disabling injury. The approach has been recognized by the United Nations as a critical component of improving road safety (UN report A/72/359). Although slightly different approaches exist in various countries, the PIARC Road Safety Manual outlines the key elements of the Safe System approach (https://roadsafety.piarc.org/en/road-safety-management/safe-system-approach) and reinforces the Safe System principles outlined by the International Transport Forum (ITF 2016):

1. People make mistakes that can lead to road crashes

2. The human body has a limited physical ability to tolerate crash forces before harm occurs

3. A shared responsibility exists amongst those who design, build, manage and use roads and vehicles and provide post-crash care to prevent crashes resulting in serious injury or death

4. All parts of the system must be strengthened to multiply their effects; and if one part fails, road users are still protected.

The key components of a good Safe System are described in PIARC's Road Safety Manual (RSM) (https://roadsafety.piarc.org/en/road-safety-management/safety-management-system) and are presented in Figure 1 below (https://roadsafety.gov.au/nrss/safe-system.aspx).

Safe System principles

The National Road Safety Strategy is based on the Safe System approach to improving road safety. This involves a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles and road users. It is an inclusive approach that caters for all groups using the road system, including drivers, motorcyclists, passengers, pedestrians, cyclists, and commercial and heavy vehicle drivers. Consistent with our long-term road safety vision, it recognises that people will always make mistakes and may have road crashes—but the system should be forgiving and those crashes should not result in death or serious injury.

Key inputs to the Safe System are:

- using data, research and evaluation to understand crashes and risks
- developing road rules and enforcement strategies to encourage compliance and manage non-compliance with the road rules
- managing access to the road through licensing drivers and riders and registering vehicles
- providing education and information
- being open to and seeking innovation
- developing standards for safe vehicles, roads and equipment
- good management and coordination

Figure 1.1: Components and Principles of a Safety System.

Human Tolerance of Crash Impacts Work to prevent crashes that result in death or serious injury Safe Roads Safe Speeds Safe People Safe Vehicles Education and information Innovation Standards Coordination Data, research and evaluation Road rules and enforcement Licensing and registration

Leadership of road agencies, and particularly system designers is therefore essential in supporting the Safe System approach, in addition to close working partnerships with all agencies and stakeholders with a potential impact on road trauma reduction. To support this need the World Road Association (PIARC) has an ongoing Strategic Theme focus on road safety that is focussed on providing world-class resources including the PIARC Road Safety Manual (https://roadsafety.piarc.org/en) that has been directly recognised by the United Nations (UN resolution A/RES/70/260 and A/RES/72/271) for application around the world. This report provides an important contribution to global road safety through a summary of National Safe System Policies and Implementation.

1.2. BACKGROUND

The report has been prepared by a working group from the National Road Safety Policies and Programs Technical Committee (TC C.1) of the World Road Association (PIARC). The results provide a summary of current progress towards Safe System policies and practice worldwide. The report also highlights the steps that low, middle and high-income countries alike can take to accelerate progress towards Safe System outcomes that support the achievement of the UN Sustainable Development Goals and associated United Nations Global Road Safety Performance Targets.

The WHO Global Status Report for Road Safety (WHO, 2018) collects detailed information on national road safety leadership, policies and practice for all member countries worldwide. This report is designed to supplement the WHO survey with more detailed experience and case studies from a selection of countries to support infrastructure road safety best practice worldwide.

The report consolidates current practice in the application of safe road infrastructure in relation to national legislation, policies, road safety strategies, safety management systems, road infrastructure funding regimes and initiatives focused on Safe System outcomes. Examples of existing policies and practice are provided to support the sharing of knowledge and to provide case studies for the benefit of road agency and road safety practitioners around the world.

1.3. CURRENT ROAD SAFETY PERFORMANCE PRIORITIES

At the global level progress towards acheivement of the SDG targets is alarmingly slow. The World Health Organisation Global Status Report (WHO, 2018) shows the level of road death and injury continues to increase with an estimated 1.35 million road deaths worldwide in 2016 compared to 1.24 million road deaths in 2010. Rapid motorisation in low and middle-income countries is creating challenges for road safety leaders and a stalling of progress in many high-income countries is a cause for concern.

In response to this trend, United Nations Member States with the support of WHO, the United Nations Economic Commission for Europe, UNICEF, World Bank and other agencies agreed on a set of 12 Global Road Safety Performance Targets (refer Figure 1.2) to focus the measurement and management of road safety progress around the world in support of the UN SDG's (WHO, 2018).

Figure 1.2: Global Road Safety Performance Targets.

The United Nations Road Safety Collaboration are currently developing a series of guideline documents to support the implementation and monitoring of progress against the targets. The targets cover the key components of Safe System performance including road safety management, safe road design, safe vehicles, safe road user behaviour and post-crash response.

Of particular relevance to road agencies are Targets 1-4.:

- Target 1 – By 2020. all countries establish a comprehensive multisectoral national road safety action plan with time bound targets.
- Target 2 – By 2030, all countries accede to one or more of the core road safety related UN legal instruments
- Target 3 – By 2030, all new roads acheive technical standards for all road users that take into account road safety, or meet a three-star rating or better.
- Target 4 – By 2030, more than 75% of travel on existing roads is on roads that meet technical standards for all road users that take into account road safety.

The International Road Assessment Programme (iRAP), in support of the UN Global Road Safety Performance Targets, completed a study of the potential lives saved from focussed investment in safer road infrastructure and safer speeds worldwide. The study has estimated that 467,000 lives per year can be saved (iRAP, 2018). The study results are presented in Figure 1.3, which also demonstrate that acheiving at least 75% of travel on 3-star or better roads will deliver a high return on investment, with an estimated $8 of benefits for every $1 invested, with even higher returns in low and middle-income countries. The study estimates that over the lifetime of the road treatments more than 100 million deaths and injuries could be avoided worldwide.

UN TARGET 4 >75% of travel on roads that meet technical standards` For all road users by 2030 (equivalent to 3-star or better)					
	Low income	Lower middle income	Upper middle income	High income	ALL
Number of countries	31	45	51	50	177
CURRENT SITUATION					
Annual number of fatalities	195,569	423,148	472,563	116,331	1,207,611
Fatalities per 100,000 population	24.2	17.1	19.6	9.2	17.3
Annual number of fatalities and serious injuries	2,151,259	4,654,628	5,198,193	1,279,641	13,283,721
Annual cost of fatalities and serious injuries (% if GDP)	5.8%	4.2%	4.7%	2%	2.9%
WHAT CAN BE ACHIEVED with >75% of travel on 3-star or better roads for all road users by 2030*					
Annual investment as a % of GDP (2018)	0.14%	0.18%	0.12%	0.14%	0.14%
Reduction in fatalities per year	86,342	169,259	174,106	37,332	467,039
Reduction in fatalities and serious injuries (FSI) over 20 years	18,995,159	37,237,024	38,303,352	8,213,036	102,748,571
Economic Benefit ($US)	$273bn	$1,335bn	$5,063bn	$4,507bn	$11,180bn
Benefit Cost Ratio	18	9	16	5	8

*Full assumptions and national snapshots are available at **vaccineforroads.org**

Figure 1.3: The Business Case for Safer Roads (https://www.vaccinesforroads.org/)

While incremental improvements to road infrastructure performance can save lives, the Safe System approach ultimately seeks to deliver zero fatalities and serious injuries. The Vision Zero approach, which has been used in Sweden, encapsulates this philosphy with the focus that no-one should die or be seriously injured in traffic. In this regard the gradual progression to 3-star or

better roads can be challenged with a focus on determining the permissable speeds and infrastructure design required to deliver 5-star performance and fatality risk approaching zero. Any departures from 5-star performance must therefore be justified as part of a Safe System approach. Information related to the relationship between Star Ratings and Crash Costs can be found in Figure 1.4 below.

Figure 1.4: Relationship between Star Ratings and Crash Costs (Adapted from OECD, 2016)

The road features and typical speeds that deliver 5-star performance were summarised in the recent WHO Global Status Report (WHO, 2018) and provide a high-level link between the road design features and traffic speeds needed to deliver Safe System outcomes and ultimately vision zero (Figure 1.5).

Star Rating	Pedestrians	Bicylists	Motorcyclists	Vehicles
*	No sidewalk, No safe crossing, 60 km/h traffic	No cyclepath, No safe crossings, Poor road surface, 70 km/h traffic	No motorcycle lane, undivided road, Trees close to road, winding alignment, 90 km/h traffic	Undivided road with narrow centerline, Trees close to road, Winding alignment, 100 km/h traffic
***	Sidewalk present, Pedestrian refuge, Street lighting, 50 km/h traffic	On road cycle lane, Good road surface, Street lighting, 60 km/h traffic	On-road motorcycle lane, Undivided road, Good road surface, >5m to any roadside hazards, 90 km/h traffic	Wide centerline separating oncoming vehicles, >5m to any roadside hazards, 100 km/h traffic
*****	Sidewalk present, Signalized crossing with refuge, street lighting, 40 km/h	Off-road dedicated cycle facitlity, raised platform crossing of major roads, street lighting	Dedicated separated motorcycle lane, central hatching, no roadside hazards, straight alignment, 80 km/h traffic	Safety barrier separating oncoming vehicles and protecting roadside hazards, straight alignment, 100 km/h

*For details on the full model for all road users and more urban and rural examples see https://www.irap.org//3-star-or-better/what-is-star-rating.

Figure 1.5: Safe System and 5-Star Roads (WHO, 2018)

Safe System investment in safe speeds on safer roads, well-integrated with investment in national legislation, policies and investment in safer vehicles, safer road users and improved post-crash care, has the potential to save many lives and ensure the UN Targets are acheived. Identification of current progress in Safe System implementation and case studies of success is a primary outcome of this report.

1.4. THIS REPORT

This report provides the findings from an international survey of countries on the implementation of the Safe System approach, with particular regard to safe road infrastructure. A survey was distributed to countries through PIARC Working Group networks, and responses were received from 31 countries. A copy of the survey is provided in Appendix 1, while the list of those responding is provided in Appendix 2.

The 31 countries where a response was provided is listed below in Table 1.1, which represents the distribution from low, middle and high income countries. The information provided is based on knowledge of respondents at the time of the survey, and may not reflect the complete situation in any given country. It should also be noted that there may be state/province local practices that vary from the national response provided.

Table 1: Summary of Responses Received by Country Income Level [1.]

Income Level of Country			
Low Income	**Middle Income**	**High Income**	
Ethiopa	Belize	Australia	Lithuania
India	China (Peop. Rep.)	Austria	Netherlands
Indonesia	Malaysia	Chile	Norway
Mali	Mexico	Czech Republic	Poland
Morocco	South Africa	Denmark	Portugal
Uganda	Thailand	Estonia	Sweden
		France	Switzerland
		Germany	United Kingdom
		Hungary	USA
		Italy	

1. Income categorization is based on information from the Worldbank: See the following link: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

The following section of this report provides results from this survey. This includes the following sections:

- Major challenges in address infrastructure safety (Section 2.1)
- Adoption o the Safe System approach (Section 2.2)
- Key performance indicators (Section 2.3)
- Investment methods (Section 2.4)
- Examples of infrastructure solutions (Section 2.5)
- Cultural shift to Safe System (Section 2.6).

Section 3 of this report includes concluding comments. Additional information on road safety management and institutional arrangements can be found in the individual country's national report for the PIARC 2016-2019 strategic theme *Safety of the Road System*.

2. RESULTS

The results from the questionnaire are presented in the following sections by figures/charts displaying the outcome from each section of the questionnaire tables. The results reflect the total responses from each of the 31 countries in the study. Comments to each table are given where applicable and results are summarized in the conclusions section. In Appendix 4 the reader can find a more detailed description of the various results from the questionnaire in the form of tables (2a to 7d).

2.1. MAJOR CHALLENGES IN ADDRESSING INFRASTRUCTURE ROAD SAFETY.

Figure 2.1 (and Table 2a in Appendix 4) shows a general trend that political/ government or stakeholder support is the major policy challenge in addressing infrastructure road safety. This is followed by funding and guidelines and standards to support decision making. Information on appropriate solutions was typically the least common barrier, although a number of countries still highlighted this as the most important issue. Closer analysis identified that there does not seem to be any regional or socio-economic differences in this response pattern.

There are also other main policy challenges as pointed out by some of the countries as open answers: e.g. behaviour control (France), communication from the government side (India), major regulations (Lithuania) and mentality change and assemble the road safety in the governmental entity (Portugal).

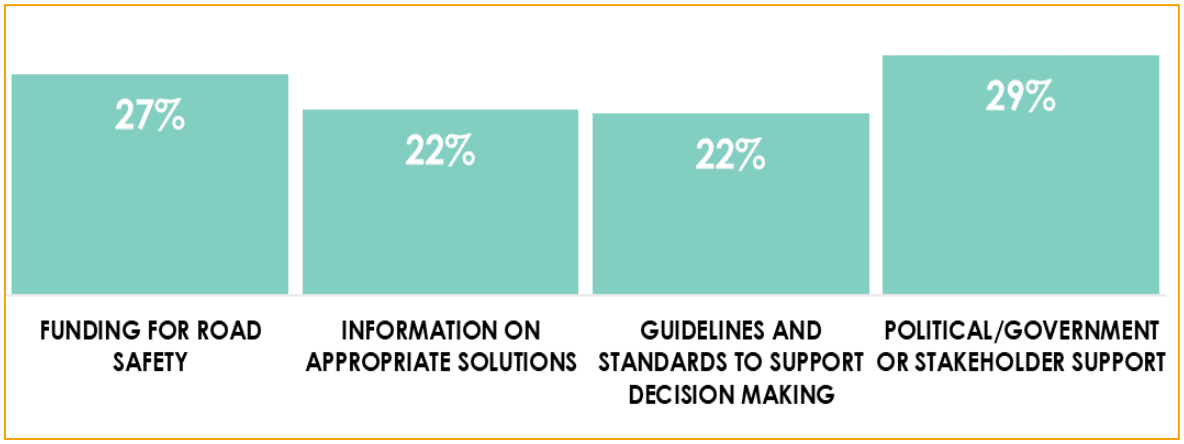


Figure 2.1: Major policy challenges in addressing road safety infrastructure.

In Figure 2.2 (and Appendix 4, Table 2b) it can be seen that there are additional road safety management challenges in the form of coordination of road safety activities by stakeholders. Ten out of 31 countries ranked this alternative as the first or second most significant challenge. Availability and training of skilled staff also appeared to be a major challenge (ranked 2nd from 11 countries). Although generally less of a challenge, crash data and knowledge on the condition of infrastructure were still seen as the most significant issues in a number of countries. Other alternatives were presented by several of the countries: e.g. appropriate measures for setting targets and measuring progress (Australia), decentralization without the need for a security approach (France), insufficient resources (Mali), National Roads and Construction Program (Poland) and risk assessment (Portugal).

Some of the Low-Middle income countries (LMICs) have indicated that crash data is an important factor in understanding and dealing with the road safety challenges. Another challenge that seems very prominent in these countries is the coordination of road safety activities by various stakeholders.

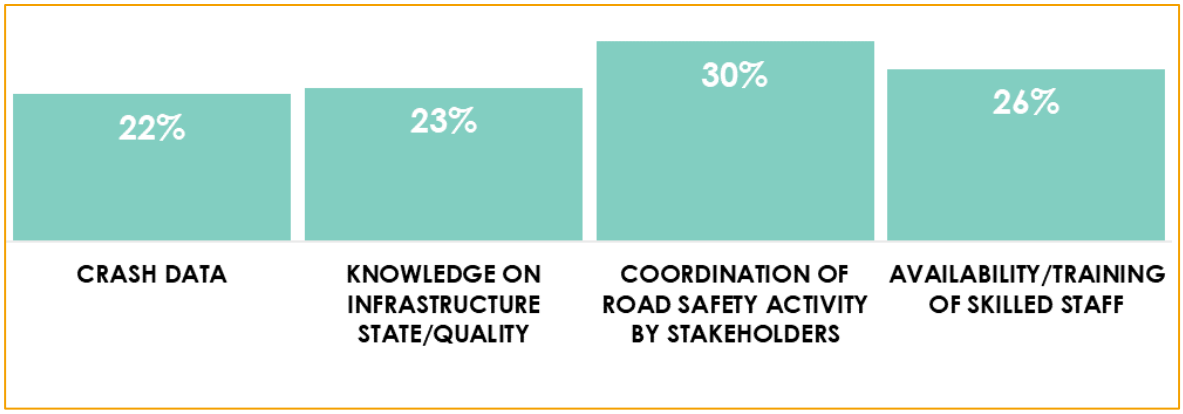


Figure 2.2: Major road safety management challenges in addressing road safety infrastructure

2.2. Road Safety Policies and Practice

2.2.1. Adoption of a Safe System Strategy

From the responses in Figure 2.3 (and Table 3 in Appendix 4) it can be seen that 20 of the 31 countries in the study have already adopted a Safe System/vision zero (or equivalent) strategy. Two of the countries (Mali and Mexico) have indicated a yes/no answer which can be interpreted that they at least have a similar strategy or one on the way.

Thus, for the remaining 8 countries there is no such strategy in place as of yet. One country (Ethiopia) indicated that the concept of Safe System/vison zero is unknown. The countries without such a strategy came from a mixture of LMICs and High income countries (HICs).

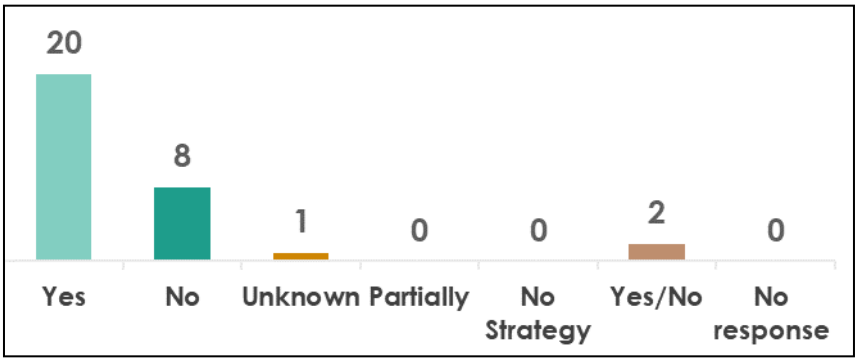


Figure 2.3 Have you adopted a Safe System or equivalent strategy?

Furthermore, in Figure 2.4 (and Table 3b, Appendix 4), 9 countries have indicated that the Safe System has been successfully implemented whereas the vast majority (17 of the countries) have responded that a safety strategy is at least partially implemented.

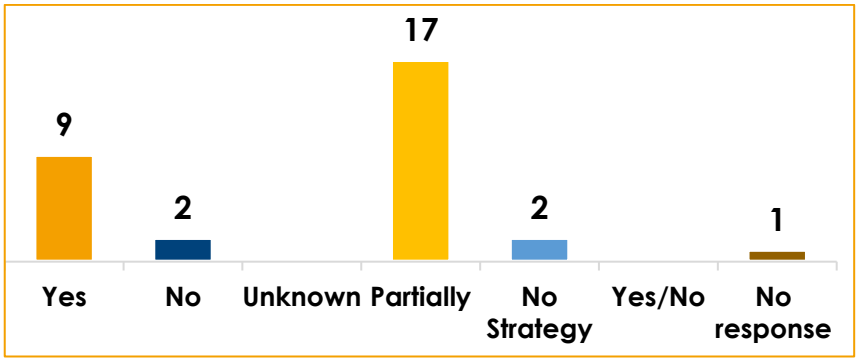


Figure 2.4 Has the strategy been successfully implemented?

The question whether there is a national legislation with mandatory targets and objectives for road infrastructure safety (Figure 2.5 and Tables 3c-d) was answered positively by 14 countries (almost 50%), one country (Switzerland) indicated a yes/no answer and one country responded unknown (China). Those countries with targets and objectives came from both HICs and LMICs. For example, in the United States there is legislation that requires States to establish annual safety performance targets, including the number and rate of fatalities and serious injuries, and the number of non-motorized fatalities and serious injuries. In Morocco, the 2017-2026 national road safety strategy was adopted by the interdepartmental road safety committee chaired by the head of government. It includes a "safer roads" component which has been broken down into a five-year action plan with objectives to be achieved in terms of improving the level of safety on the roads. The remaining 15 countries did not identify any legal support for the implementation of a Safe System strategy.

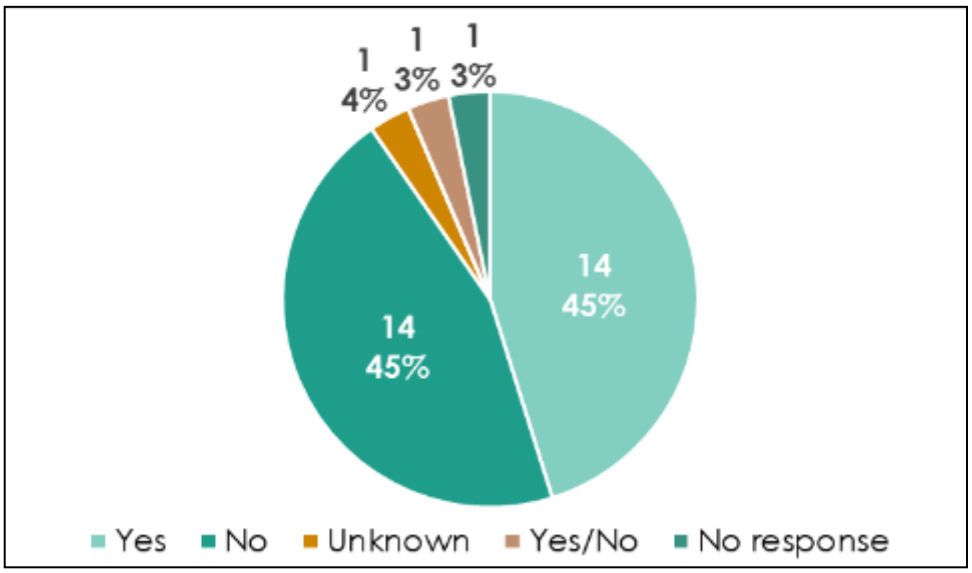


Figure 2.5 Is there mandatory targets and objectives for road infrastructure safety?

In Figure 2.6 (and Table 3d, Appendix 4) it can also be seen that the majority (68%) of the countries in the study have indicated that there are other dedicated strategies or action plans in place for road infrastructure safety.

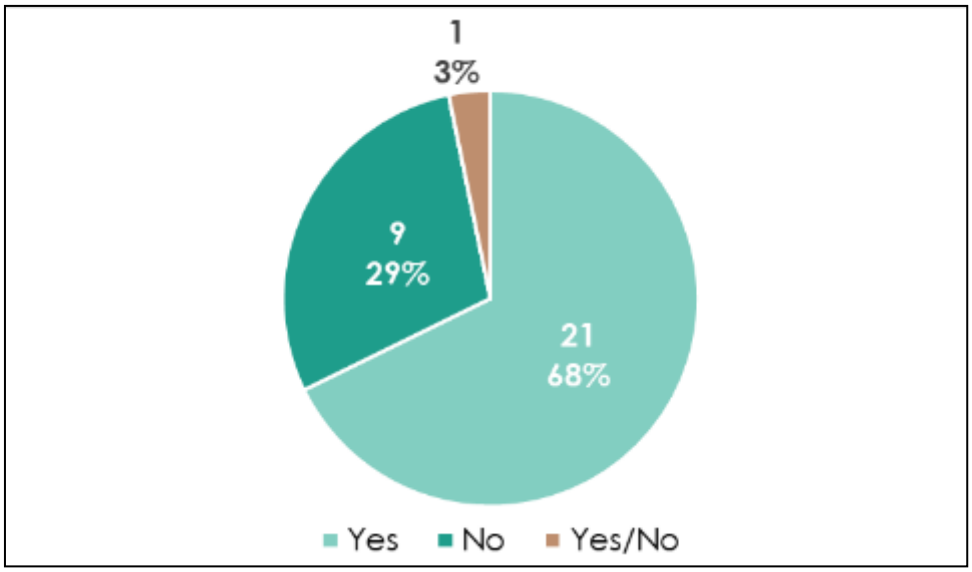


Figure 2.6 Other dedicated strategy or action plan for road infrastructure safety?

2.2.2. Speed Management Component of a Safe System Strategy

Speeds and speed management are an important component of the Safe System. Critical impact speeds have been identified above which the chance of death siginficantly increases. Typically the chance of death for pedestrians increases with vehicle impact speeds above 30 km/h; at intersections the chance of death dramatically increases from around 50 km/h; and for head-on crashes at around 70 km/h. A more detailed discussion on the role of speed and the relationship with infrastructure is provided at https://www.unroadsafetyweek.org/en/solutions/safe-roads.

From the responses in Table 3f of Appendix 4 it is clear that there are national and regional variations in the adoption of speed limits for various roads. For motorways (Figure 2.7) maximum speed limits varied between 70 km/h (in Ethiopia) to 140 km/h (Poland and USA). The maximum speed limit was typically up to 130 km/h in most central European countries, although there were exceptions in Sweden, Norway, UK and Switzerland with a maximum speed limits in the range of 110-120 km/h. In other parts of the world (Australasia and Africa) lower maximum speed limits are standard on motorways ranging from 80-120 km/h.

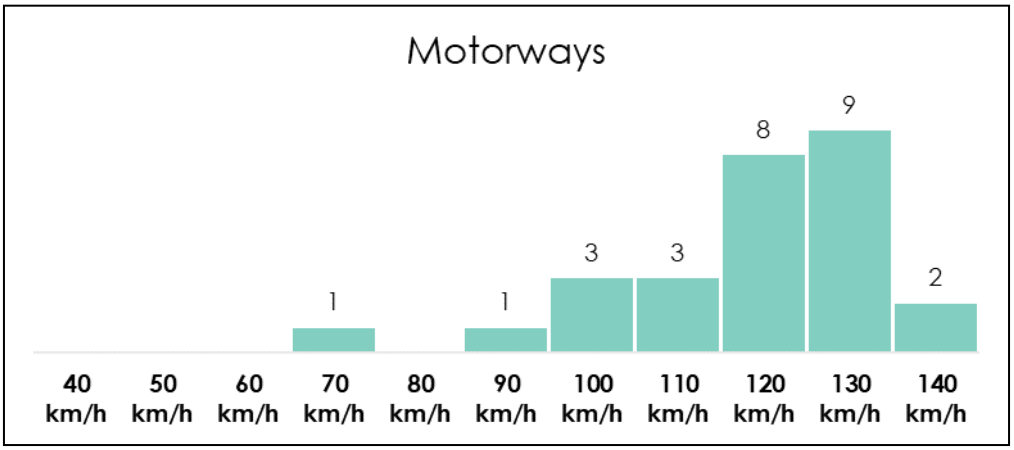


Figure 2.7 Speed limits on motorways

Speed limits on other dual carriageway (divided) roads (Figure 2.8) were typically lower than on motorways, typically falling within the range of 80-120 km/h. The most common speed was around 100 km/h.

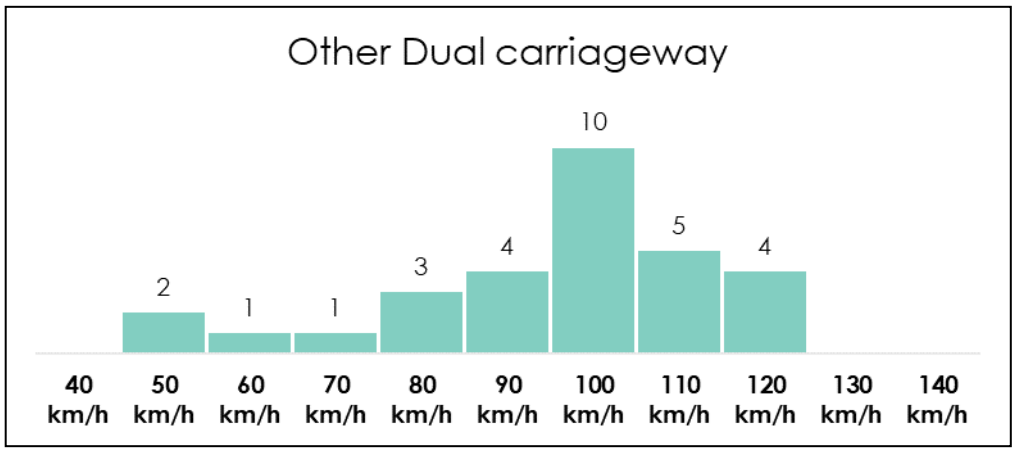


Figure 2.8 Speed limits on dual carriageway roads

For single carriageway (undivided) roads outside of urban areas (Figure 2.9), speed limits tended to fall between 70 to 100 km/h, with the most common speed being 90 km/h. Several exceptions fell outside this range, with speed limits on these roads in South Africa of 120 km/h. 80 km/h speed limits were common, especially in European countries, while even lower speed limits existed in some LMICs (e.g. 65 km/h in India; 60 km/h in Indonesia).

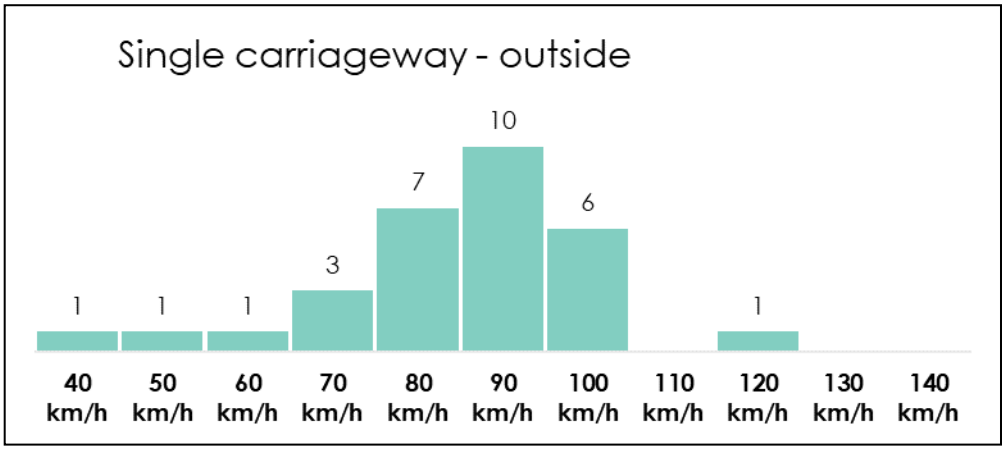


Figure 2.9 Speed limits on single carriageway roads outside urban areas

Speed limits on single carriageways inside urban areas (Figure 2.10) ranged from between 30 to 80 km/h. Speed limits of 50 km/h were typical, although it was noted that some countries were progressively introducing lower limits (e.g. 30 km/h speed limits are used in some towns (or areas within towns) in Italy).

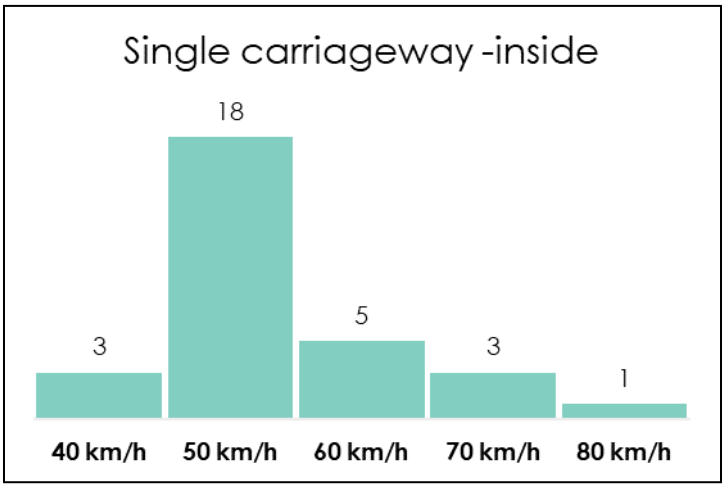


Figure 2.10 Speed limits on single carriageway roads inside urban areas

2.2.3. Automated Enforcement Component of a Safety System Strategy

In Figure 2.11 (and Table 3g, Appendix 4) the use of traffic safety cameras for speed enforcement was identified, from either fixed, mobile or average systems. The vast majority of the countries in the survey (23 out of 31, or 74%) reported that there are fixed camera systems implemented and 24 (77%) have reported also having mobile camera systems.

In addition, 13 countries (half of those responding to this question) reported having average speed camera systems in place. Five of the countries (India, Malaysia, Mexico, Thailand and Uganda) responded 'unknown' on this question. This may be interpreted that the respondent did not know if the system was adopted or that it is an unknown concept.

As can be seen in Table 3g of Appendix 4, the majority of the countries that reported missing any form of camera system are from LMICs.

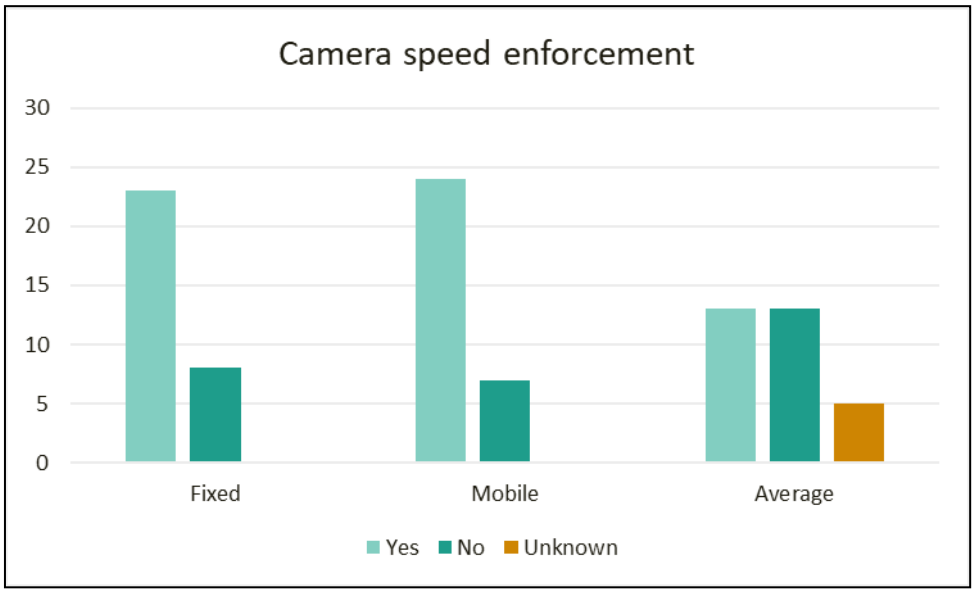


Figure 2.11 Operation of camera speed enforcement

2.3. KEY PERFORMANCE INDICATORS FOR ROAD INFRASTRUCTURE SAFETY

The vast majority of countries (28 of the countries, or over 90%) have targets for the reduction of fatalities and serious injury crashes (Table 4a in Appendix 4). Only India and the UK reported that they did not have such targets, whereas Hungary responded unknown to this question.

As indicated in Figure 2.12, around half of all countries (15 out of 31) indicated that they had road infrastructure-related KPIs for improving road safety.

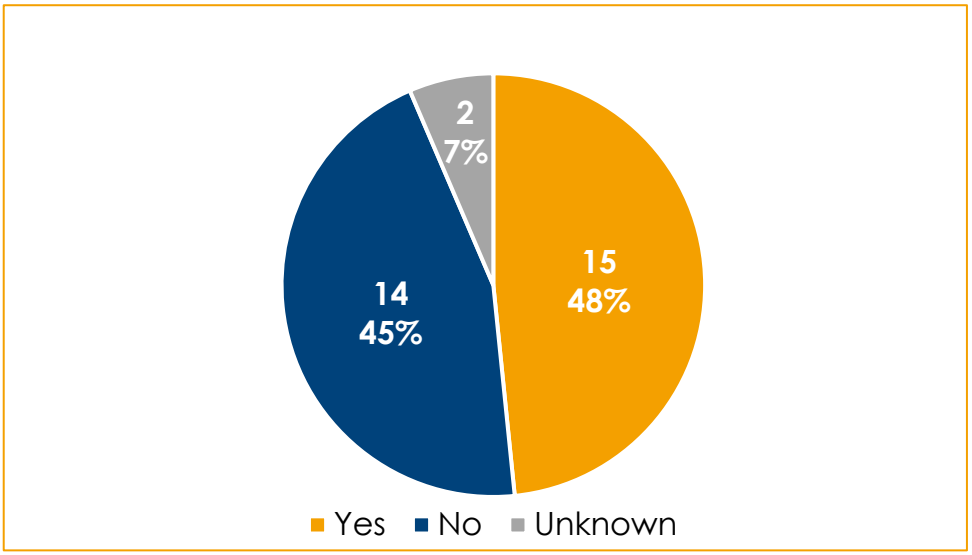


Figure 2.12 Use of key performance indicators

Further analysis of examples provided identified that the types of indicators fell into four major categories. These were (i) the number or percentage of the network that was subject to road safety audit or inspection; (ii) countries with iRAP targets; (iii) targets relating to provision of additional safe infrastructure by length; and (iv) provision of additional safe infrastructure as a percentage of the network. Examples for each of these approaches are provided below.

Several countries indicated that they use targets that relate to the extent of the network that is 'assessed' for safety. The response from Austria indicated that 10% of the existing road network should have safety inspections. South Africa also has objectives relating to the extent of the network where safety assessments were undertaken. Another target related to the number of safety auditors trained.

iRAP targets have been set in a number of different countries. This includes Malaysia (75% of travel occurring on 3-star or better roads), China, Australia, Netherlands (all national roads should be EuroRAP level 3); England (90% travel on 3 star or better by 2020 on strategic road network operated by Highways England).

Installation of additional road infrastructure as a length is used in several countries. Estonia has a target for provision of centre barrier, roadside barrier and central line rumble strip (km installed) on a national road. Portugal has targets for marking 500km of road shoulder rumble strips/sleep line/alert strips to prevent run off vehicles cause from fatigue driving or distract behaviour. There are also targets for interventions on 100km of network sections which have higher accident risk to

vulnerable road users, 100km of network sections which have higher accident risk, and improvements to 40 roads sections crossing urban areas.

Installation of additional road infrastructure as a percentage of the road network is also a common performance indicator. Examples of these specific targets include France where there are targets for the percentage of areas with pedestrians where sidewalks are provided and for the percentage of streets in conurbation that have been traffic calmed. In Lithuania there are proposals (not yet approved at the time of questionnaire) to set targets to increase the total amount of pedestrian and bicycle paths by 18 % by 2030; to complete bicycle paths of EuroVelo by 2030; and to reach a 100% total amount of safe pedestrian crossings by 2025.

In Australia there are proposals in at least one road agency to include targets for the percentage of travel on roads without mid and side barriers where speeds limits are less than 80 km/h; percentage of vehicle movements entering intersections designed at not more than 50 km/h; percentage of vehicles using roads and streets with significant numbers of children and other vulnerable roads users that are at or below 40 km/h and at or below 30 km/h; increases in safe walking and cycling mode share; and percentage of travel on local streets at or below 40 km/h and at or below 30 km/h.

Norway includes targets for the percentage of motor vehicle traffic on national roads with speed limits of 70 km/h or higher on roads with median barriers (a 50% target by 2018). There is also a target for the percentage of the national road network with a speed limit of 70 km/h or higher that meets the minimum requirements of the NTP 2014–2023 when it comes to preventing serious runoff-the-road accidents.

In Sweden there are targets for the share of traffic volume on roads with speed limit above 80 km/h and median barriers; share of safe pedestrian, cycle and moped crossings on main municipal road networks; and share of municipalities with good-quality maintenance of pedestrian and cycle paths.

2.4. INVESTMENT METHODS

Information was provided on the methods used in different countries to prioritise road investments. For a further discussion on prioritization of investments see Chapter 11 of the Road Safety Manual (https://roadsafety.piarc.org/en/planning-design-operation-intervention-selection/prioritisation-assessments).

Figure 2.13 (and Table 5 in Appendix 4) presents the responses to the various alternatives on the methods used to prioritize road investments in different countries.

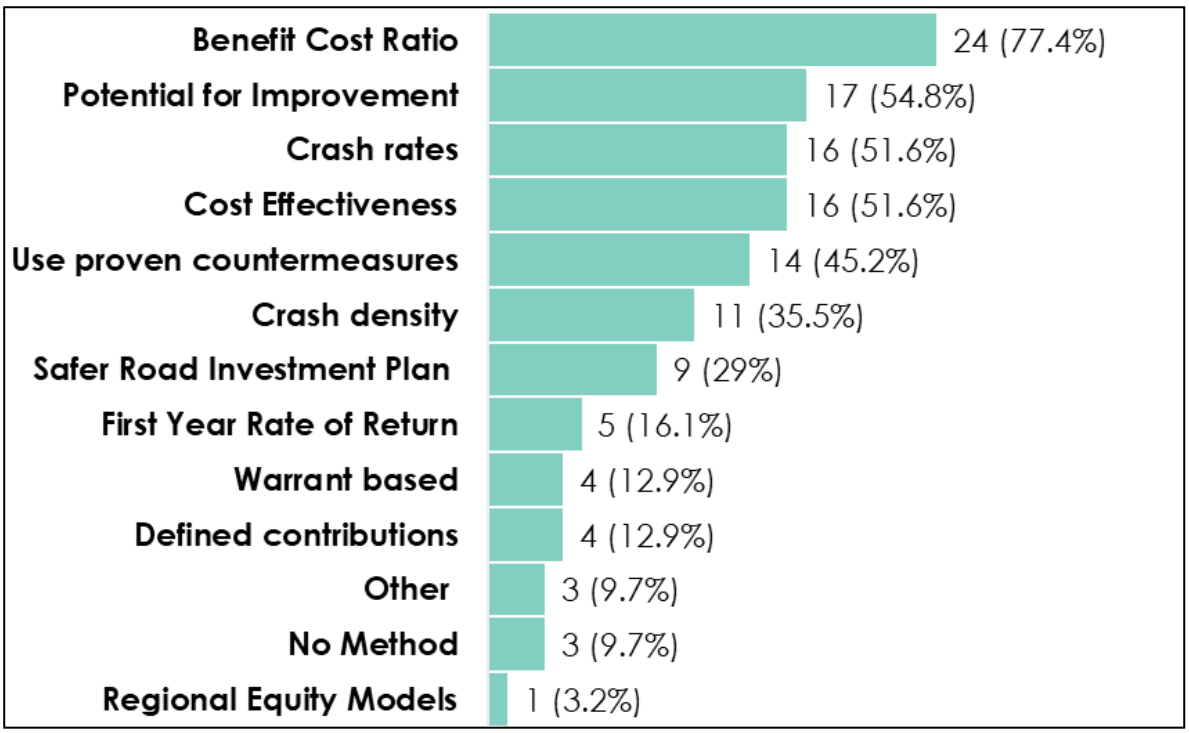


Figure 2.13 Investment methods

It is quite obvious from the results that the most common method used is according to Benefit Cost Ratio (24, or 77% of countries), followed by Potential for Improvement (17 or 55% of countries), Cost Effectiveness (16 countries or 52%) and Crash Rates (16 countries; 52%).

Only 2 countries (Mexico and Uganda) did not report any use of the investment methods presented in the survey. It may be possible that they have other approaches to prioritisation. Also, 3 countries reported the use of other/alternative methods for road investments.

There does not seem to be any difference in the response pattern due to geographic or socio-economic background. The prioritization of road investments are most likely due to national planning procedures and other internal circumstances more than regional or geographical factors.

2.5. EXAMPLES OF INFRASTRUCTURE SOLUTIONS

2.5.1. Introduction to Infrastructure Solutions

This section presents the results the 31 countries that responded to the use of various infrastructure strategies, policies, programs, and guidelines used to target different crash types and user groups. Specific responses from each country are presented in Appendix 4, Tables (6a) – 6(b). Provided below is a general overview of the responses for each crash type and user group, which are considered effective to address specific road safety problems and collision types. Refer to the PIARC Road Safety Manual or the iRAP toolkit for more information and sample photos for each of these strategies.

Crash Types

The different crash types explored for this study include head-on crashes, run off road crashes, intersection crashes, vulnerable road users and speed related crashes. As shown in Figure 2.14 below, approximately two-thirds of countries have infrastructure strategies, policies, programs, and guidelines to address head-on crashes, run-off road crashes, intersection crashes and vulnerable road user crashes. This increases to about 85% of responding countries for speed related crashes. The following sections provide a brief description of the common strategies reported for each crash type.

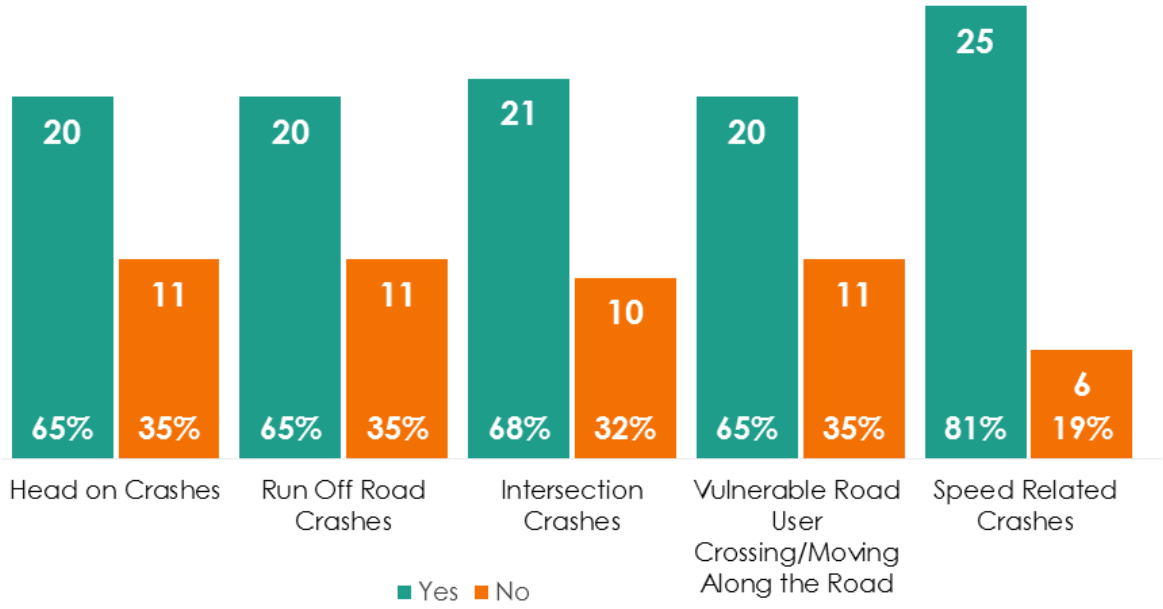


Figure 2.14 Number of Countries with Policies, Strategies, Actions Addressing Crash Types

2.5.2. Head-On Crashes

Twenty countries responding to the questionnaire have means to prevent head-on crashes with oncoming traffic. Nine of these countries indicate that the country's design standards/guidelines or their safety plan define the specific strategies depending on the road type and speed. The most common infrastructure strategies reported to address head on crashes include:

- Median barriers
- Signing/marking overtaking areas
- Overtaking lanes
- Wide centreline treatments
- Centerline rumble stripes

Figure 2.15 Cable median barrier in New Zealand, Source: iRAP

However, 11 countries have reported not having any form of strategy, program or guideline to deal with this serious problem of road safety.

There seem to be a mix of policies and technical design solutions around the world in this respect but also a need for further knowledge and development for several countries that still lack proper solutions. Of these the majority seem to be from LMICs but also from some European countries like France, Italy, Poland and Switzerland.

Figure 2.16 Centerline rumble-stripe in USA, Source: FHWA

2.5.3. Run-Off Road Crashes

As for run off road crashes the patterns is somewhat like the results from head on collision prevention strategies. However, some of the countries that did not have any specific strategies for head on crashes have some means for preventing run off road crashes (e.g. Indonesia and Lithuania).

On the other hand a number of countries that reported having strategies for head on crashes seem to have less preventive means for run off road crashes (e.g. Estonia and Netherlands). This is a bit surprising since these are all European High Income countries, nevertheless, this could of course be a result of other factors (including missing data).

A number of countries report using roadside management practices that first consider providing adequate clear zone or providing adequate protection if clear zone requirements cannot be met. Germany reports using speed reduction strategies if obstacles cannot be removed or protected. Common strategies to target run off road crashes include:

- Clear Zones
- Roadside barriers (with effective end treatments)
- Sand bars
- Shoulder sealing
- Rumble strips
- Delineation
- Pavement treatments

Figure 2.17 Shoulder Sealing, Source: iRAP

Figure 2.18 Delineation, Source: iRAP

2.5.4. Intersection Crashes

For intersection crashes, the same general pattern is very similar to the results from head on collision and run off road prevention strategies. To a large extent the same countries that previously reported no specific solutions to crash prevention for head on and run off road crashes also reported no strategies for the intersection crash problem.

Many countries have standards or guidelines to direct intersection safety improvements, while others have specific intersection safety plans (e.g. Lithuania) or identify specific improvements via road safety audits or similar procedures (e.g. Czech Republic, Morocco). Common strategies reported to address intersection crashes include:

- Roundabouts
- Raised Intersections (in low speed environments)
- Auxiliary/turning lanes
- Protected right turn lanes
- Sight distance improvements
- Traffic Signals
- Systemic application of multiple low cost countermeasures at stop-controlled intersections
- Reduced left turn conflict intersections
- Traffic signal back plates with retroreflective borders
- Yellow change interval

Figure 2.19 Roundabout, Source: iRAP

2.5.5. Vulnerable Road User Crashes

Twenty countries reported having strategies, policies, programs, and guidelines to target vulnerable road user crashes. Eight of these countries cite specific regulations, plans, standards or technical guidelines, while the remaining countries cite specific strategies. It is interesting to note that many counties have adopted speed reducing strategies and policies to address vulnerable road user crashes.

Common strategies to reduce vulnerable road user crashes include:

- Separate paths
- Raised crossings (especially near schools and bus stops)
- Signalized crossings
- Lower speed limits through speed humps, signs and markings, road diets, etc.
- Marked crosswalks
- Pedestrian Islands
- Dedicated pedestrian crossings (e.g. bridge)
- Lighting

Figure 2.20 Marked crosswalk with pedestrian island, Source: iRAP

2.5.6. Speed-Related Crashes

More countries (25 of 31) have strategies, policies, programs, and guidelines targeting speed-related crashes. Some of these countries reported specific speed restriction plans, technical guidelines and standards addressing speed-related crashes, while others referenced specific strategies they use. For example, five countries reported using lower speed limits, reinforced by infrastructure in some cases, in residential areas, school zones, urban areas and high risk rural areas. In addition, four countries reported using 30 km/hr zones in cities. A summary of other common strategies targeting speed-related crashes is provided below.

- Targeted speed enforcement
- Static and mobile speed awareness signs
- Traffic calming (e.g. speed humps, road diets)
- Design elements (e.g. road islands entering towns, pedestrians islands in built-up areas, roundabouts)
- Speed cameras
- Rumble Strips

Figure 2.21 30 km/hr zone, Source: iRAP

2.5.7. User-Groups

The different user groups explored for this study include pedestrians, bicyclists, motorcyclists, vehicle occupants, heavy vehicles and semi-autonomous or autonomous vehicles. As shown in Figure 2.22 below, approximately two-thirds of countries have policies or systematic programs in place to improve safety for pedestrians and bicyclists. However, only about half of the responding countries have policies and programs for motorcyclists. 55-60% of responding countries report policies and programs for vehicle occupants and heavy vehicles. On the other hand, only 25% of responding countries have strategies for semi-autonomous or autonomous vehicles, with high income countries have the lead in this emerging area. The following sections provide a brief description of the common policies and systematic programs reported for each user group.

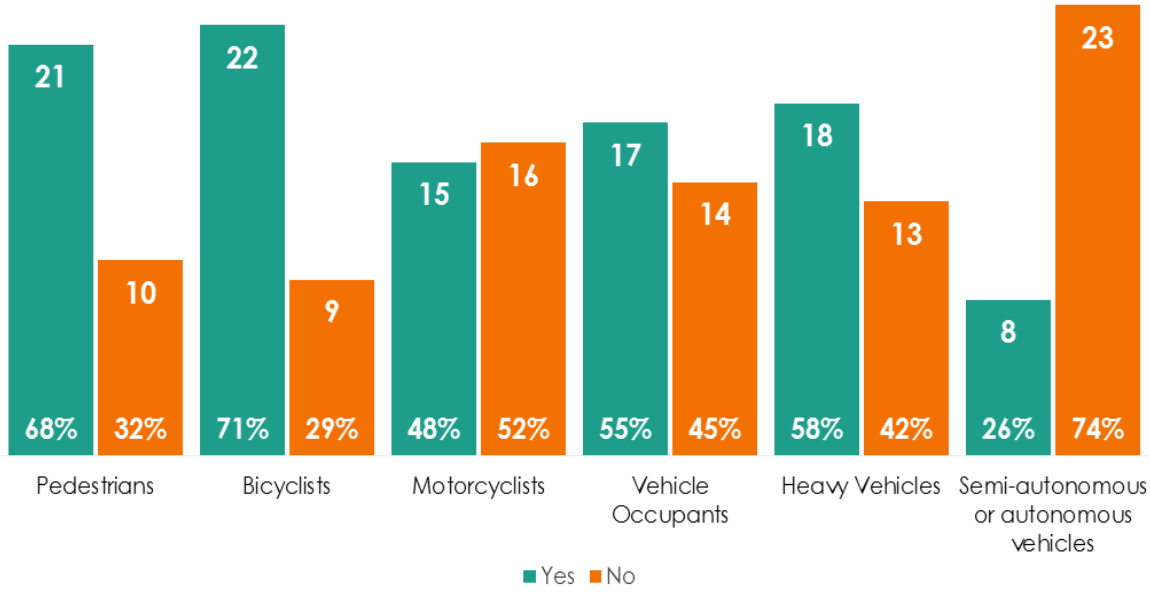


Figure 2.22 Number of countries with policies or systematic programs in place for each user group

Pedestrians

At some point in the day, everyone is a pedestrian. Pedestrians are considered vulnerable road users because they have less protection, and are at more risk in traffic. In many countries, collisions with pedestrians are a leading cause of death and injury. However, only 21 of 31 responding countries indicated they have policies or systematic programs in place to address road safety for pedestrians.

Morocco and Norway have action plans that address pedestrians, and Sweden has a dedicated strategy for vulnerable road users. France also reported the evolution of laws related to pedestrians and rules of the road. In addition, both Poland and France report that individual cities and communities have specific pedestrian programs and policies. In the US, many State and local agencies have adopted Complete Streets policies (for more information on Complete Streets see the following ink https://smartgrowthamerica.org/program/national-complete-streets-coalition/). Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Other policies and systematic programs to address pedestrian safety include:

- Pedestrian crossings
- Lower speed limits
- Vehicle free or pedestrian zones
- Separation
- Car-free days
- Reflective elements for pedestrians
- Targeted enforcement at high risk crossings / school zones
- Traffic safety education programs
- School crossing guards

Figure 2.23 Pedestrian Zone Sign

Bicyclists

Bicyclists are amongst the most vulnerable of all road users. When a crash occurs between motor vehicle and a bike, it is the cyclist who is most likely to be injured. However, bicycles improve access to employment and education opportunities in lower income countries, higher income countries are increasingly bicycling to commute, for exercise, or just for fun. Like pedestrians, about 70% of countries report policies or systematic programs to address road safety for bicyclists.

Figure 2.24 Bicycle Lane, Source: iRAP

Mexico, Morocco, Norway and Sweden address bicycle safety as part of their larger national safety plans, while the Czech Republic and France reference specific national plans for bicyclists, including safety. Other policies and systematic programs to address bicyclist safety include:

- Off road bicycle paths
- On road protected paths
- Bicycle lanes
- Safe cycling education programs

Motorcyclists

In many countries, motorcycles are a popular form of transportation. However, unlike other forms of transportation, there is very little protection for motorcycle riders and passengers. When crashes do occur, they often have very severe consequences. About half of the countries responding to the questionnaire reported having policies or systematic programs in place to address safety for motorcyclists. There is national research in China, a national strategy specific to motorcycles in Norway and the Czech Republic indicates that a variety of activities are organized annually in the spring by regional and local agencies. Other policies and systematic programs to address motorcyclist safety include:

- Provide segregated lanes
- Motorcycle friendly guardrail
- Speed reducing measures that will not cause skidding
- Blackspot programs for motorcycle routes and curves
- Enhanced maintenance programs
- Helmet laws and campaigns
- Safety Education Campaigns targeting motorcyclists and vehicle drivers

Figure 2.25 Motorcyclist wearing helmet, Source: FHWA

Vehicle Occupants

By far the largest number of motor vehicle crash deaths are occupants of passenger vehicles including cars, minivans, pickups, SUVs and cargo/large passenger vans. The likelihood of crash death varies markedly among these vehicle types according to size. Seventeen of the thirty-one (or 55%) respondents report having policies or systematic programs to address the safety of vehicle occupants. Many of these policies and programs include laws and education campaigns to increase occupant protection (e.g. seat belts for front and rear passengers, child passenger seats, vehicle regulations and driver license requirements.

Heavy Vehicles

Heavy vehicles include large trucks and buses. While they have an important role to play in the economic wellbeing of a country, there can be serious safety consequences in crashes involving heavy vehicles. Nearly 60% of all responding countries have polices tor systematic programs in place to address the safety of heavy vehicles, including:

- Restricted access
- Inspection stations
- Automatic on board control for speed
- Weigh stations
- Safety Training courses for heavy vehicle drivers (i.e. initial and continuous)
- Enforcement for drivers and bus operators
- Size and weight requirements
- Licensing requirements

- Safety education campaigns (e.g. blind spots)

Semi-autonomous and Autonomous Vehicles

Automated vehicles have the potential to remove much of the human error from the crash equation, which will help protect drivers and passengers, as well as bicyclists and pedestrians.[1]

Only eight of the responding countries have policies or systematic programs in place to address safety of autonomous or semi-autonomous vehicles. The level of activity ranges from just getting started by establishing committees to discuss, identify, coordinate and prepare preliminary reports on the implementation of AV technology in Malaysia to the Netherlands allowing semi-automated and automated vehicles after approval by the national government based on an extensive procedure regarding all technical and safety issues. In addition, China has developed guidance on autonomous vehicle road tests and management, while Hungary is preparing to design a new highway to test autonomous vehicles.

2.6. CULTURAL SHIFT TO SAFE SYSTEM

As shown in Figure 2.26 below, around a third of respondents indicated that they had not yet started implementing a Safe System approach, or that they had just started. Many of these were LMICs, but there were also several HICs included. The most common response was that countries were making progress (39%). Interestingly, around a quarter of respondents indicated that they were well advanced in implementing a Safe System. Most of these were from HICs as would be expected, but this group also included China. Only one country (Austria) identified that they have fully implemented the Safe System approach.

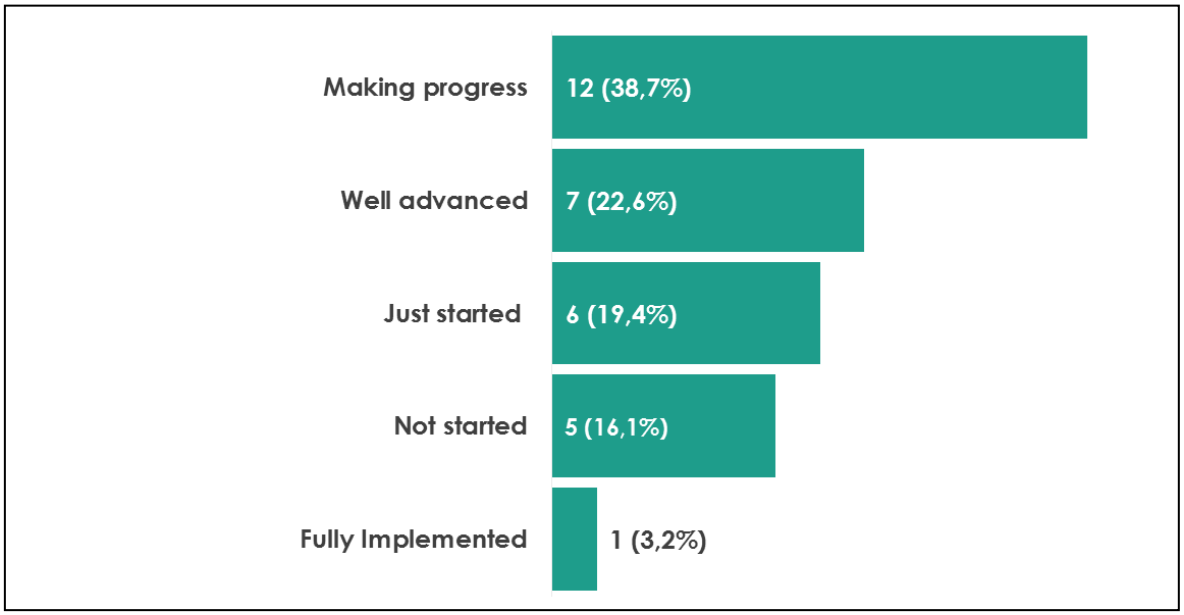


Figure 2.26 Number of responses related to progress towards a road network with zero deaths/safe system/vision zero in your country/jurisdiction

[1] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

Figure 2.27 Safe System Progress by LICs

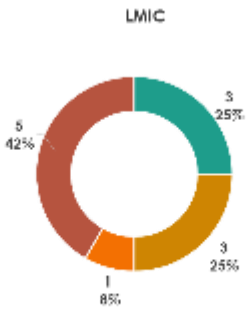
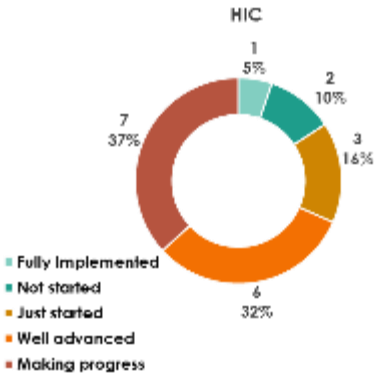


Figure 2.28 Safe System Progress by HICs



The ITF report on Safe System highlighted some key principles around adoption of a Safe System approach. One of these principles was that the focus of the approach should be on the eventual elimination of fatal and serious injury. This question attempted to identify country understanding of this principle. More than two-thirds of respondents indicated that the primary objective of their safety policies was to address fatal and serious injuries, as shown in Figure 2.29 below. However, quite a few countries provided multiple responses to this question indicating that this was not the 'primary' objective, but just one of the objectives. Around 40% of respondents did identify addressing fatal and serious injuries as their sole primary objective.

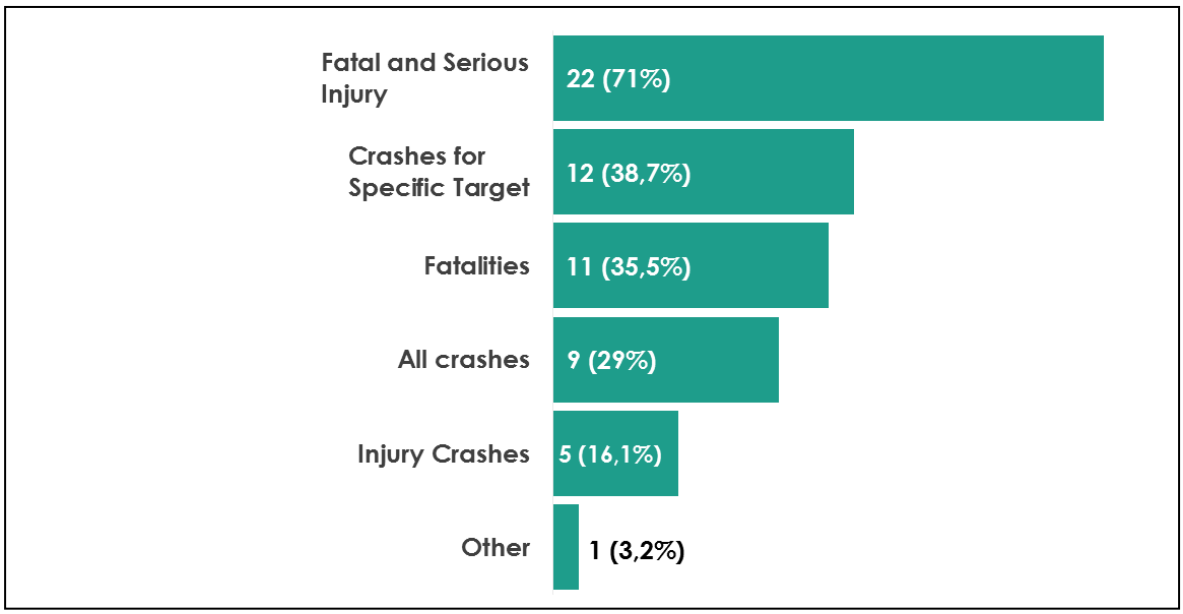


Figure 2.29 Number of responses related to focus of road safety policies

Another principle from the ITF report is that there is a shared responsibility to addressing road safety. All actors in the system need to work together to address road safety problems. A number of respondents recognised this shared responsibility, with almost 40% (12 out of 31) countries indicating all actors in the system had some responsibility. Most countries indicated that there were multiple groups who needed to work together to improve safety. The most commonly identified participants were road designers/managers and police. The least recognised contributors were emergency service providers and vehicle manufacturers. Figure 2.30 below presents a more detailed summary of the responses.

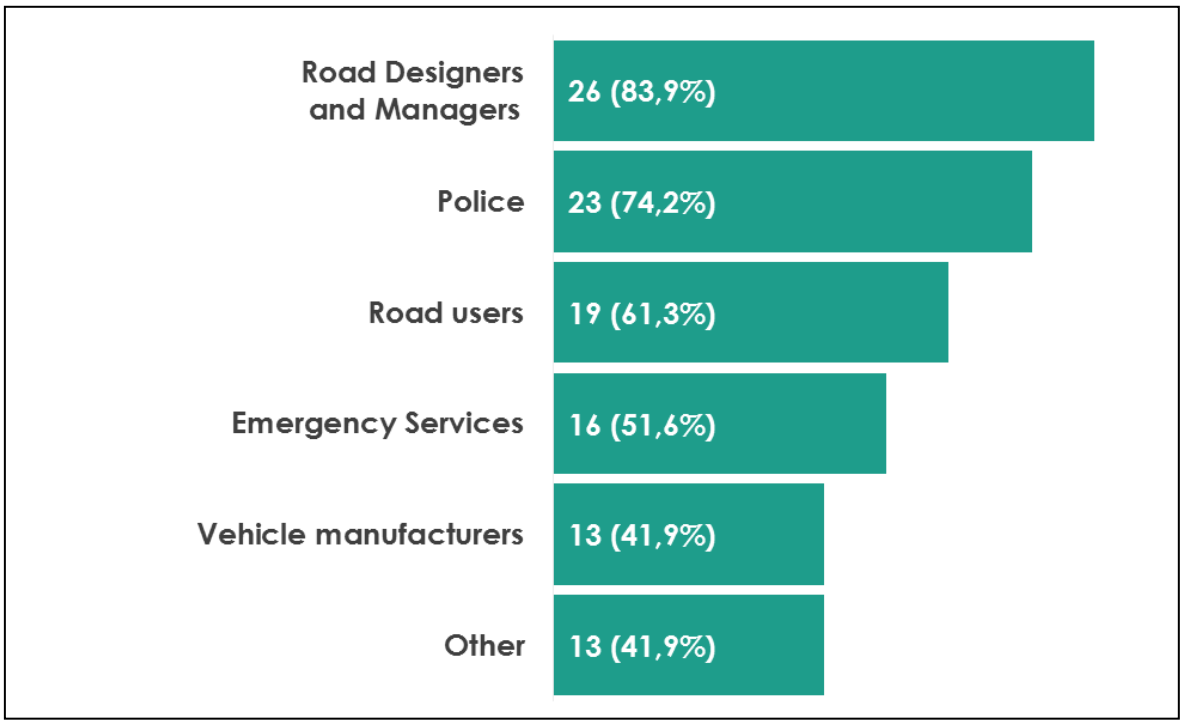


Figure 2.30 Number of responses related to which entity is responsible for reducing death and serious injury on the road

A further element of the Safe System approach as outlined by the ITF report is that an approach to road safety that takes account of all pillars (safe roads, safe road users, safe vehicles and safe speeds) is required. As shown in Figure 2.31 below, the vast majority of countries (84%, or 26 out of 31) identified that all of these key pillars were important for reductions in death and serious injury.

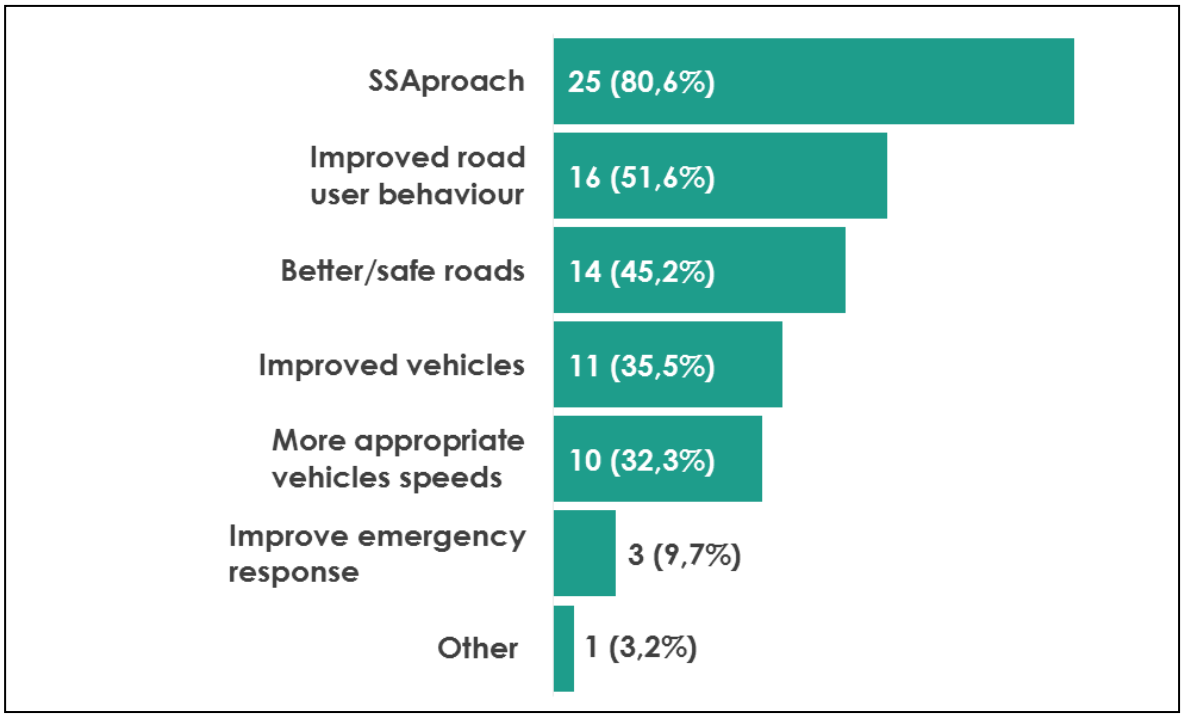


Figure 2.31 Number of responses for what will result in the greatest reductions in deaths and serious injuries

3. CONCLUSIONS

This section takes the key findings from the results section, drawing these results together to provide some conclusions and recommendations (the recommendations are in **BOLD** text below). It is duly noted that the focus of this report is related to infrastructure road safety elements, with limited focus on the institutional arrangements and management of safety. It should be understood that successful Safe System approach involves more than infrastructure actions, recognizing the need for a hositic approach that encompasses education, enforcement, management and institutional procedures in support of collision reduction and prevention.

It is clear that road agencies still face significant barriers when implementing Safe System policies. In regards to policy challenges, support and funding are still seen as the major barriers. Guidance and information on appropriate solutions were also identified. While support and funding issues are harder to address, provision of guidance and information on solutions are available. PIARC is collecting the experience of road authorities and operators from around the world and disseminates both recommendations and good practices on a wide range of road safety related topics. Other global or regional bodies (such as iRAP, WHO, European Commission, etc.) produce detailed guidance. All of this information is available for immediate implementation. **Further actions are therefore required to help build capacity based on the existing information and to promote a concrete implementation of the already stated policies and technical procedures**.

In regards to management challenges, coordination and availability of skilled staff were highlighted as the most significant issues, followed by lack of crash data and knowledge of the road state/condition. Models for effective road safety coordination exist (e.g. World Bank, 2013) and there are capacity building initiatives to improve skills, but greater efforts and funding are required to produce the appropriate skills gap required to address the global road safety crisis.

It is encouraging that knowledge regarding the Safe System is relatively high, and many countries have now adopted this approach. However, only a third of respondents to this survey indicated that their countries had successfully implemented a Safe System approach. In regards to Safe System infrastructure, only half of the surveyed countries reported that they had successfully implemented specific targets at natinoal level, while others indicated that such targets were embedded in other strategic plans.

Speed management, including the setting of appropriate speed limits is a key element of a Safe System for roads. The survey indicated that for our safest class of roads (motorways) speed limits were typically in the range of around 120 km/h. On other divided roads, the speeds limits were typically around 100 km/h, while on single carriageway, undivided roads, speeds were typically around 80-90 km/h. Some LMICs had speed limits significantly lower than 100 km/h, and this would most likely reflect the lower design standards and mix of road users in these locations. Generally the speed limits on urban roads was around 50 km/h, although there appears to be an increasing use of lower speed limits in some countries, perhaps to reflect the access by vulnerable road users in these environments. **It is apparent that there are differences in maximum speeds within each type of roadway and it would be useful to explore the safety performance of roads with higher or lower speed limits in regards to the infrastructure that is provided**. The majority of countries surveyed deploy speed cameras to enforce speed limits, although it was notable that LMICs were slower to adopt this technology.

The vast majority of countries have set road safety targets, although in many cases (around half of these surveyed) there were no specific targets relating to safe road infrastructure. The use of targeted Key Performance Indicators (KPI's) to assist in setting ambitious road safety targets and track progress towards these is increasingly recognised as an important element of managing road safety, including KPIs for infrastructure. Infrastructure KPI's that had been adopted included the number or percentage of the network that was subject to road safety audit or inspection; countries with iRAP targets; targets relating to provision of additional safe infrastructure by length; and provision of additional safe infrastructure as a percentage of the network. **Further advice is required for road agencies regarding effective infrastructure KPI's. The examples identified in Section 2.3 of this report provide a useful starting point.**

Most countries have methods to prioritise road safety investments, and similarly, most use multiple methods. The most commonly used approach is Benefit-Cost Ratio, but Potential for Improvement, Cost Effectiveness and Crash Rates are also commonly used. **Although guidance does exist on differnet methods for prioritisation (including in the PIARC Road Safety Manual), there is little information on the most appropriate method within the Safe System approach. Guidance on the strengths and weaknesses of different methods would be useful**.

In regards to effective road safety solutions to address common crash types, the majority of countries had policies, strategies and actions to address these. However, around one third of countries did not have such activities to address the key crash types of head-on, run-off-road, intersection, and vulnerable road user crashes. Many countries also lacked effective strategies to address speed related crashes. Most of the countries lacking such activities were LMICs, although it is notable that this list also included some HICs. Section 2.5 contains a wide selection of treatment options to support other PIARC guidance on this topic (e.g. PIARC Road Safety Manual).

Different policies, strategies and actions were in place to address different road user groups. The majority of countries have such activies to address pedestrian and cyclist risk. However, only around a half of countries had strategies to address motorcycle risk. A similar proportion of countries had stategies to address vehicle occupants and heavy vehicles. Not surprisingly, only a few countries had strategies to address semi-autonomous or autonomous vehicles, and these were typically HICs. Section 2.5 contains a wide variety of solutions for addressing risk for different road user groups.

The final set of questions related to the cultural shift to a Safe System approach. One third of respondents indicated that they had not yet started implementing a Safe System approach, or that they had just started. Many of these were LMICs, but there were also several HICs included.

The ITF report on Safe System highlighted some key principles around adoption of a Safe System approach. There was a reasonable level of understanding of these key principles, although there is still room for improvement in understanding. Many countries still focused on elimination of all crashes, or focused just on fatal outcomes rather than those events that might results in death and serious injury. Many countries failed to identify the role of post-crash care or of vehicle manufacturers within a Safe System. **Further education is required to more clearly explain the core elements of the Safe System approach, and how this might be delivered more effectively.**

The results from this survey represent current activity in a wide variety of countries, including those in LMICs and HICs. All countries are encouraged to benchmark their own road safety activity against the actions undertaken by those contributing to this survey. All countries stand to gain some improved knowledge by assessing the policies and activities that will lead them to greater Safe System implementation.

4. GLOSSARY

Term	Definition
Automated Enforcement Component	Automated speed enforcement systems include fixed cameras that can continually monitor traffic speeds without a human operator, and/or mobile camera operations.
Autonomous Vehicles/Cars	Also known as a robotic car, self-driving car, or driverless car, is a vehicle that is capable of sensing its environment and moving with little or no human input.
Benefit Cost Ratio	Best value for money investments in road safety planning.
Dual Carriageway	A road/motorway with divided carriageways for traffic in opposite directions (also mid-barriers and a 2+1 road system).
EuroVelo	The European cycle route network for existing and planned national and regional cycle routes in a single European network.
Global Road Safety Performance Targets	The global performance targets on key risk factors and service delivery mechanisms to reduce road traffic fatalities and injuries, aligned to the UN Sustainable Development Goals for 2030.
International Transport Forum	The Annual Summit of the International Transport Forum is the world's largest gathering of transport ministers and the premier global transport policy event.
International Road Assessment Programme (iRAP)	A worldwide organization for the international collaboration of investment in safer road infrastructure and safer speeds.
iRAP Targets	The targets set up by the iRAP to monitor the development and investment in safer road infrastructure.
Key Performance Indicors	Indicators for setting targets and tracking progress in road safety.
Kinetic Energy Exchange	The exchange of crash forces in a road collision incident.
Median Barriers	Physical barriers in the median section of the road.
Rumble Strips	A section along the road shoulder or median with *jagged asphalt* that creates a vibration and audible warning or alert the driver.
Road Safety Manual	The Manual developed by PIARC to describe and exemplify road safety actions and innovations from a global perspective.
Safe System Approach	The common understanding that no one should be killed or seriously injured from using the road network.
Safe System Implementation	National and worldwide implementation of the Safe System.

Safe System Principles	A set of principles to describe the ideas behind the Safe System.
Safe System Strategy	A strategy designed to implement and uphold the Safe System.
Single Carriageway	A road with one, two or more lanes arranged within a single carriageway with no central reservation to separate opposing flows of traffic.
UN Global Road Safety Performance Targets	The UN targets agreed upon to focus the measurement and management of road safety progress around the world.
Vision Zero Approach	The philosophy with the focus that no-one should die or be seriously injured in traffc (see also Safe System approach)
WHO Global Status Report	The Global status report on road safety is the first broad assessment of the road safety situation in 178 countries, using data drawn from a standardized survey.

5. REFERENCES

[1] ITF 2016, Zero Road Deaths and Serious Injuries : Leading a Paradigm Shift to a Safe System, OECD Publishing, Paris, France.

[2] iRAP 2018, *Vaccines for Roads* 4th Ed., iRAP, Basingstoke, UK.

[3] *PIARC, 2009, Catalogue of design safety problems and potential countermeasures,* Report 2009R07EN, World Road Association, Paris, France.

[4] WHO, 2018, *Global status report on road safety*, World Health Organisation, Paris, France https://www.who.int/violence_injury_prevention/road_safety_status/2018/en/

[5] World Bank 2013, Road Safety Management Capacity Reviews and Safe System Projects, Global Road Safety Facility, Washington, DC.

APPENDIX 1

Copy of questionnaire - Road Safety Survey: Application of safe road infrastructure

INTRODUCTION

The United Nations, in their Sustainable Development Goals (SDGs), have set the target of reducing global road fatalities and serious injuries by 50% by 2020, compared to 2010 levels. Yet rapid motorization in many low- and middle-income countries points to the risk of further increases in the number of road fatalities and serious injuries in the coming years. Leadership of road agencies in addressing these pressing global issues is important to share best practice and practical experience.

This survey has been prepared by a working group from the National Road Safety Policies and Programs Technical Committee of the World Road Association (PIARC). The results will help prepare information to improve road safety, particularly in low and middle income countries.

OBJECTIVE OF SURVEY

The WHO Global Status Report for Road Safety collects detailed information on national road safety leadership, policies and practice. This survey is currently being conducted with results available in mid-2018. The PIARC questionnaire is designed to supplement the WHO survey with more detailed experience and case studies to support infrastructure road safety best practice.

The purpose of the questionnaire is to capture from local experts details on best practice in the application of safe road infrastructure in relation to national legislation, policies, road safety strategies, safety management systems, road infrastructure funding regimes and initiatives focussed on Safe System outcomes. Case studies of actual implementation experience are encouraged including success stories and obstacles to success.

The results of the survey will be included in a PIARC Report for dissemination globally and selected materials to be included in the PIARC Road Safety Manual (http://roadsafety.piarc.org/). Evidence of policies and practice will be required to support responses and ensure materials are available for the benefit of all PIARC members. Interview responders are encouraged to seek the inputs of key stakeholders in the country to ensure all major initiatives in the country are captured.

PART 1: CONTACT INFORMATION FOR PERSON COMPLETING SURVEY

Country / Jurisdiction:	
Name:	
Position within organisation:	
Institutional affiliation:	
Address	
e-mail:	
Telephone number:	

PART 2:DEFINITION OF THE ROAD SAFETY PROBLEM IN YOUR COUNTRY/JURISDICTION

2a: What are the major challenges in addressing infrastructure road safety in your country, regarding policies? (please rank from 1 to 5, with 1 being most important)

Funding for road safety Rank:

Information on appropriate solutions Rank:

Guidelines and standards to support decision making Rank:

Political/government or stakeholder support Rank:

Other: _____ Rank:

Comments:

2b: What are the major challenges in addressing infrastructure road safety in your country, regarding road safety management? (please rank from 1 to 5, with 1 being most important)

Crash data Rank:

Knowledge on existing infrastructure state/quality Rank:

Coordination of road safety activity by stakeholders Rank:

Availability/training of skilled staff Rank:

Other: _____ Rank:

Comments:

PART 3:ROAD SAFETY POLICIES AND PRACTICE

3a: Have you adopted a Safe System / Vision Zero / Towards Zero / Sustainable Safety or equivalent strategy in your country?

Yes ☐ Please provide details:

No ☐ If no, please explain what other strategy your country has adopted or is planning to adopt?

Unknown ☐

3b: If there is a strategy is it being successfully implemented?

There is no strategy ☐

Yes ☐

Partially ☐

No ☐

Please indicate and describe the major obstacles.

3c: Is there National Legislation with mandatory targets and objectives for road infrastructure safety in your country?

Yes ☐ - Please highlight the major goals or provide a copy if possible.

No ☐

Unknown ☐

Comments:

3d: Is there any other dedicated strategy or action plan for road infrastructure safety in your country, besides the National legislation?

Yes ☐ - Please provide details or a copy of this if possible.

No ☐

Unknown ☐

Comments:

3e: Is there specific guidelines and policies for safer road infrastructure? Please provide details of specific policies with examples and links to relevant documents, and also regulatory or technical standards.

3f: What is the speed limit (km/h or mph) on:

Motorways:

Other dual carriageways / median divided roads:

Single carriageways - outside built-up areas

Single carriageways - inside built-up areas.

If possible, please provide links to relevant documents, legislation and indicate regulatory or technical standards.

3g: Does your country operate:

Traffic camera speed enforcement from fixed cameras: Yes ☐ No ☐ Unknown ☐

Mobile cameras: Yes ☐ No ☐ Unknown ☐

Average speed cameras (speed measured over a pre-determined distance)? Yes ☐ No ☐ Unknown ☐

If possible, please provide details of specific policies, and regulatory or technical standards.

PART 4: KEY PERFORMANCE INDICATORS

The focus of this part of the survey is the collection of information on infrastructure-related key performance indicators (KPIs), or the measurement of safety and related performance tracking.

4a: Do you have a target for fatal and serious crash reduction and/or for fatalities and injuries (e.g. 50% reduction in deaths by 2020 when compared to 2010)?

Yes ☐ - Please include this target here and links to any relevant document if this exists:

No ☐

Unknown ☐

Comments:

4b: Do you have a road infrastructure related target for improving safety? Examples may include:

- % of high speed network (e.g. >= 80 km/h) with median separation;
- % of network or % of travel with a 3-star or better iRAP performance standard;
- % pedestrian areas with footpath provision / % of local roads where pedestrians are present with low speed environments (e.g. <30 km/h)
- % of network where pedestrians and cyclists are present that have safe pedestrian and cycle crossings (e.g. signalised crossings, raised platforms, grade-separated facilities)
- % of intersections with safe turning provision (e.g. roundabouts, turning lanes, merge lanes)

Yes ☐ - Please include these targets here:

No ☐

Comments:

PART 5: INVESTMENT METHODS

5a: What methods do you use to prioritize road investments? (tick as many as apply)

No method	☐
Benefit-Cost Ratio	☐
Cost-Effectiveness	☐
First year rate of return	☐
Potential for improvement	☐
Regional equity models	☐
Use proven countermeasures	☐
Defined contributions	☐
Warrant based	☐
Crash rates	☐
Crash density	☐
Safer Road Investment Plan	☐

Other (please state):

PART 6: "SAVE LIVES" PERFORMANCE INDICATORS

6a: Do you have specific examples of infrastructure strategies/policies/systematic programs/guidelines in your country to treat the following crash types?

Head On crashes (e.g. separate high speed oncoming traffic)

No ☐

Yes ☐ - Please provide examples:

Run Off Road crashes (e.g. make the sides of roads safer)

No ☐

Yes ☐ - Please provide examples:

Intersection crashes (e.g. design safer intersections)

No ☐

Yes ☐ - Please provide examples:

Vulnerable road user crossing/moving along road

No ☐

Yes ☐ - Please provide examples:

Speed related crashes (e.g. restrict traffic and speed in residential, commercial and school zones)

No ☐

Yes ☐ - Please provide examples:

6b: Do you have specific examples of policies/systematic programs in your country to address road safety for the following user groups?

Pedestrians (e.g. prioritizing people by putting in place vehicle-free zones)

No ☐

Yes ☐ - Please provide examples:

Bicyclists (e.g. provide bicycle lanes)

No ☐

Yes ☐ - Please provide examples:

Motorcyclists (e.g. provide motorcycle lanes)

No ☐

Yes ☐ - Please provide examples:

Vehicle Occupants

No ☐

Yes ☐ - Please provide examples:

Heavy Vehicles

No ☐

Yes ☐ - Please provide examples:

Semi-autonomous or autonomous vehicles

No ☐

Yes ☐ - Please provide examples:

PART 7: SAFE SYSTEM/VISION ZERO SELF ASSESSMENT

7a: In your opinion, what is your progress towards a road network with zero deaths / Safe System/Vision Zero in your country/jurisdiction?

Not started ☐

Just started ☐

Making progress ☐

Well advanced ☐

Fully implemented ☐

Comments:

7b: For your country/jurisdiction do the road safety policies primarily target a reduction in:

All crashes (fatal, injury and non-injury) ☐

Injury crashes (fatal, serious and minor injury) ☐

Crashes for specific target groups (pedestrian, motorcyclists,…) ☐

Fatal and serious injury ☐

Fatalities ☐

Other (please state) ☐

Please provide examples

7c: Which entity/public body is responsible for reducing death and serious injury on the road?

Road users ☐

Road designers and managers ☐

Emergency service providers ☐

Police ☐

Vehicle manufacturers ☐

Other (please state) ☐

Comments:

7d: In your opinion, for your country/jurisdiction what will result in the greatest reduction in deaths and serious injuries on the road? Please rank the top three

Improved road user behaviour ☐

Better/safer roads ☐

Improved vehicles ☐

Improved emergency response ☐

More appropriate vehicle speeds ☐

A systems approach including all of these ☐

Other ☐ - please state:

Comments:

Thank you for taking part in this survey! Please return by **Friday 6th April.**

APPENDIX 2

Name of person who responded, and disclaimer that the response is based on their best knowledge

Country	Contact
Australia	Blair Turner
Austria	Rainer Kienreich
Belize	Pamela Ann Scott
Chile	Tomas Echaveguren
China (Peop. Rep.)	Li Chunfeng
Czech Republic	Josef Mikulik
Denmark	Rikke Rysgaard
Estonia	Maria Pashkevich
Ethiopa	
FRANCE	Benoît Hiron
Germany	Ralf Baumann
Hungary	Zita Egyhazy
India	Jacob George
Indonesia	Tri Tjahjono
Italy	Roberto Arditi
Lithuania	Mindaugas Katkus
Malaysia	Nurul Syazana Binti Sofian
Mali	Tidiani Ibrahima Deka Diabate
Mexico	Ricardo Pérez-Núñez
Morocco	Saïd El Karkouri
Netherlands	Peter van der Knaap
Norway	Yngvild Munch-Olsen
Poland	Przemysław Padło
Portugal	Eduardo Nabais
South Africa	Randall Cable
Sweden	Ruggero Ceci / Matts-Åke Belin
Switzerland	Stefan Siegrist
THAILAND	Sujin Mungnimit
Uganda	Ronald Amanyire
United Kingdom	Suzy Charman
USA	Karen Scurry

APPENDIX 3

Tables 2a to 7d:

Table 2a: *Priority of Policy Challenges To Address Infrastructure Road Safety by Country*

Country	Funding for Road Safety		Guidelines and Standards to Support Decision Making	Political/Gov't or Stakeholder Support	*Other*	*Other Rank*
Australia	2	4	3	1		
Austria	4	3	2	1		
Belize	1	4	3	2		
Chile	3	4	2	1		
China	4	3	2	1		
Czech Republic	2	-	-	1	Effective legislation	3
Denmark	2/3	4	5	2/3		1
Estonia	2	3	4	1		
Ethiopia	3	1	5	2	Local availability of road safety materials	2
France	4	3	0	2	behaviour control	1
Germany	2	4	3	2		
Hungary	4	2	4	3		
India	3	1	1	2	Communication from Govt side	1
Indonesia	2	2	2	3	Stake-holders corporation	4
Italy	4	2	3	4		
Lithuania	4	5	2	3	Major regulations	1
Malaysia	1	1	1	1		
Mali	2	2	0	1	sensitization	2
Mexico	2	5	4	1	local evidence on impact evaluation of policies	3
Morocco	3	4	0	1	legislation	2
Netherlands	1	4	3	2	(New) Sense of urgency	5
Norway	1	4	3	2		
Poland	1	5	2	3	The legislative process – adjusting the low to technological progress and latest knowledge	4
Portugal	5	4	3	2	Mentality Change and Assemble he Road Safey in one governmental entity	1
South Africa	1	2	3	4	Community Engagement/Buy-in	5
Sweden	3	1	2	4	Knowledge of Road Safety	5
Switzerland	3	2	3	5		
Thailand	1	3	4	2		
Uganda	1	3	3	2		
UK	1	4	2	3	capacity to deliver to SS objectives	5
US	4	2	1	3		

Table 2b: *Priority of Road Safety Management Challenges To Address Safe Infrastructure by Country*

Country	Crash Data	Knowledge on Infrastructure state/quality	Coordination of road safety activity by stakeholders	Availability/training of skilled staff	Other	Other Rank
Australia	5	2	3	4	Appropriate metrics for setting targets and measuring progress towards these for infrastructure	1
Austria	1	4	2	3		
Belize	1	4	2	3		
Chile	1	5	4	3	Research	2
China	2	3	1	4		
Czech Republic	N/A	2	1	3	Consequent monitoring and evaluation	4
Denmark	5	5	5	5		
Estonia	4	3	1	2		
Ethiopia	1	3	1	1		
France	5	4	3	2	Decentralization without the need for an infrastructure security approach	1
Germany	3	3	2	2		
Hungary	3	4	2	3		
India	3	3	2	1		
Indonesia	3	1	4	2		
Italy	2	3	4	4		
Lithuania	5	4	2	1		
Malaysia	2	3	2	3	Allocation for safety improvement	2
Mali	2	2	1	3	insufficient resources	1
Mexico	4	5	1	2	Availability of other resources (material and financial)	3
Morocco	2	3	1	5	Improvement of relief provided to victims	4
Netherlands	5	4	3	2	Funding	1
Norway	4	1	2	3		
Poland	5	2	3	4	The National Roads and Highways Construction Program 2014-2023	1
Portugal	2	5	4	3	Risk Assessment Model	1
South Africa	4	3	1	2	Consistency in approach	5
Sweden	4	2	1	3	Allocating resources in the right way	5
Switzerland	1	3	2	2		
Thailand	4	3	1	2		
Uganda	1	1	2	2		
UK	5	4	2	3	Lack of targets and PIs	1
US	4	1	3	2		

Table 3a-d: *Summary of Road Safety Policies and Success by Country*

Country	3a: Have you adopted a Safe System / Vision Zero / Towards Zero / Sustainable Safety or equivalent strategy in your country?	3b: If there is a strategy is it being successfully implemented?	3c: Is there National Legislation with mandatory targets and objectives for road infrastructure safety in your country?	3d: Is there any other dedicated strategy or action plan for road infrastructure safety in your country, besides the National legislation?
Australia	Yes	Partially	No	No
Austria	Yes	Yes	No	Yes
Belize	Yes	Yes	No	Yes
Chile	No	No	Yes	No
China	Yes	Yes	Unknown	Yes
Czech Republic	Yes	Partially	Yes	Yes
Denmark	No	Partially	No	Yes
Estonia	Yes	Yes	Yes	No
Ethiopia	Unknown	No	No	No
France	Yes	Partially	Yes	Yes
Germany	Yes	Yes	Yes	Yes
Hungary	No	0	0	Yes
India	No	No Strategy	No	No
Indonesia	No	Partially	Yes	Yes
Italy	Yes	Partially	No	No
Lithuania	Yes	Yes	Yes	No
Malaysia	Yes	Yes	No	Yes
Mali	Yes/No	Partially	Yes	Yes
Mexico	Yes/No	Partially	No	Yes
Morocco	Yes	Partially	Yes	Yes
Netherlands	Yes	Partially	Yes	Yes
Norway	Yes	Yes	Yes	Yes
Poland	No	Partially	No	Yes
Portugal	No	Partially	Yes	Yes
South Africa	Yes	Partially	Yes	Yes
Sweden	Yes	Yes	No	No
Switzerland	Yes	Partially	Yes/No	Yes/No
Thailand	Yes	Partially	No	No
Uganda	No	No Strategy	No	No
UK	Yes	Partially	No	Yes
US	Yes	Partially	Yes	Yes

Table 3f: *Summary of Speed Limits by Country*

Country	Motorways	Other Dual carriageway	Single carriageway - outside	Single carriageway -inside
Australia	100 km/h (sometimes 110 km/h)	Usually 100 km/h	100 km/h	50 km/h
Austria	130 km/h	100 km/h	50 km/h	50 km/h
Belize	0	0	0	0
Chile	120 km/h	120 km/h	90 to 100 km/h	50 to 60 km/h
China	120km/h	100km/h, 80km/h, 60km/h, 40km/h etc.	70km/h, 30km/h(at junctions, sharp curves and other special sections).	70km/h, 30km/h (at junctions, sharp curves and other special sections).
Czech Republic	130 km/h	110 km/h	90 km/h	50 km/h
Denmark	130 km/h	80 km/h	80 km/h (common practice)	50 km/h
Estonia	no motorways in EE	90 km/h, seasonal increase up to 110 km/h only on some stretches	90km/h	50 km/h
Ethiopia	70 km/h	50 km/h	40 km/h	40 km/h
France	130	110	90, then 80 from 1 July 2018	70 or 50 depending on the geometry traffic and adherence to local life
Germany	orientation speed 130 km/h	120 km/h	100 km/h	30 -50 km/h
Hungary	130 km/h by car 80 km/h by vehicle 100 km/h by bus	110 km/h	90 km/h	80 km/h
India	100 km/h	80 km/h	65 km/h	40 km/h
Indonesia	80 km/h in urban area roads and 100 km/h in inter-urban roads	national roads are 60 km/h	national roads are 60 km/h	40 km/h
Italy	130 km/h	110 km/h	90 km/h	50 km/h (zones "30" progressively being identified by local authorities)
Lithuania	130, 120 km/h in summertime; 110 km/h in wintertime.	90 km/h	90 km/h	50 km/h
Malaysia	80 km/h – 90km/h (urban); 110 km/h (Inter-urban)	60 km/h – 70 km/h	70 km/h – 90 km/h	40 km/h – 50 km/h
Mali	90	50	90	60
Mexico	0	100 km/h	80 km/h (common practice)	50 km/h
Morocco	120 km/h	100 km/h	80 km/h	80-60 km/h
Netherlands	80 - 100 – 120 – 130	80 – 100	80 – 100 Zone 60 for rural access roads	50 – 70 Zone 30 for urban access roads
Norway	100 or 110 km/h	80 or 90 km/h	80 km/h	30, 40 or 50 km/h
Poland	140 km/h	120 km/h Expressways / 100 km/h other roads	normally 90 km/h / 100 km/h on Expressways	50/60 km/h (60 at night)
Portugal	120 km/h	100 km/h	90 km/h	50 km/h
South Africa	120 km/h	120 km/h	120 km/h	60 km/h
Sweden	120, 110 (standard)	100	80 (90)	60 (70) and 40 (50)
Switzerland	120 km/h	100 or 80 km/h	80 km/h	50/30 km/h
Thailand	120 km/h	90 km/h	90 km/h	50 - 80 km/h
Uganda	No Motor ways	100 km/h for passenger and dual-purpose vehicles and 80 km/h for heavy motor vehicles	100 km/h for passenger and dual-purpose vehicles and 80 km/h for heavy motor vehicles	50 km/h
UK	70 mph	70 mph	mostly 60 mph, but some will be posted lower as exceptions	20, 30 or 40 mph depending on road environment
US	55-85 mph	45-65 mph	35-45 mph	25-35 mph

Table 3g: *Summary of Automated Speed Enforcement by Country*

Country	Fixed	Mobile	Average
Australia	Yes	Yes	Yes
Austria	Yes	Yes	Yes
Belize	No	No	No
Chile	No	No	No
China	Yes	Yes	Yes
Czech Republic	Yes	Yes	Yes
Denmark	No	Yes	No
Estonia	Yes	No	No
Ethiopia	No	No	No
France	Yes	Yes	Yes
Germany	Yes	Yes	No
Hungary	Yes	Yes	No
India	No	No	Unknown
Indonesia	No	No	No
Italy	Yes	Yes	Yes
Lithuania	Yes	Yes	Yes
Malaysia	Yes	Yes	Unknown
Mali	No	No	Yes
Mexico	Yes	Yes	Unknown
Morocco	Yes	Yes	No
Netherlands	Yes	Yes	Yes
Norway	Yes	Yes	Yes
Poland	Yes	Yes	Yes
Portugal	Yes	Yes	No
South Africa	Yes	Yes	Yes
Sweden	Yes	Yes	No
Switzerland	Yes	Yes	No
Thailand	Yes	Yes	Unknown
Uganda	No	Yes	Unknown
UK	Yes	Yes	Yes
US	Yes	Yes	No

Table 4: *Use of Key Performance Indicators by Country*

Country	4a: Do you have a target for fatal and serious crash reduction and/or for fatalities and injuries (e.g. 50% reduction in deaths by 2020 when compared to 2010)?	4b: Do you have a road infrastructure related target for improving safety?
Australia	Yes	Yes
Austria	Yes	Yes
Belize	Yes	Unknown
Chile	Yes	No
China	Yes	Yes
Czech Republic	Yes	No
Denmark	Yes	No
Estonia	Yes	Yes
Ethiopia	Yes	No
France	Yes	Yes
Germany	Yes	Unknown
Hungary	Unknown	Yes
India	No	No
Indonesia	Yes	No
Italy	Yes	No
Lithuania	Yes	Yes
Malaysia	Yes	Yes
Mali	Yes	Yes
Mexico	Yes	No
Morocco	Yes	No
Netherlands	Yes	Yes
Norway	Yes	Yes
Poland	Yes	No
Portugal	Yes	Yes
South Africa	Yes	Yes
Sweden	Yes	Yes
Switzerland	Yes	No
Thailand	Yes	No
Uganda	Yes	No
UK	No	Yes
US	Yes	No

Table 5: *Methods Used to Prioritize Road Safety Investments by Country*

Country	No Method	Benefit Cost Ratio	Cost Effectiveness	First Year Rate of Return	Potential for Improvement	Regional Equity Models	Use proven counter-measures	Defined contributions	Warrant based	Crash rates	Crash density	Safer Road Investment Plan	Other
Australia		x	x		x		x					x	
Austria		x								x	x		
Belize			x				x			x		x	x
Chile		x	x	x									
China		x	x		x		x			x			
Czech Republic					x	x	x	x					
Denmark		x	x	x			x			x	x	x	
Estonia		x								x	x	x	
Ethiopia		x	x		x								
France	x	x	x	x	x		x			x	x	x	x
Germany		x	x							x			
Hungary		x	x										
India	x	x							x				
Indonesia					x			x	x				
Italy													
Lithuania		x	x		x		x			x			
Malaysia	x	x	x		x		x		x			x	
Mali		x			x			x					
Mexico													
Morocco		x			x					x	x		x
Netherlands		x	x		x						x		
Norway		x	x		x					x	x	x	
Poland		x	x		x					x	x		
Portugal					x		x			x	x	x	
South Africa		x		x			x			x			
Sweden		x			x		x						
Switzerland		x			x		x			x	x		
Thailand		x					x		x	x	x		
Uganda													
UK		x	x	x								x	
US		x	x		x		x	x		x			

Table 6a (1) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* Head-On Collisions

Country	Strategy
Australia	WRSB, other barrier types, wide centreline treatments
Austria	Creating middle barriers.
Belize	Systematic program in place. MOW standards through legislative instrument in Belize – National Public Works Act. Design standards conform to USMUTCD.
Chile	
China	In the industrial standard named Specification for Design of Highway Safety Facilities, it is regulated that the median separation barriers should be set up on the motorway and the artery of Class I highway with a median separation less than 12 meters. Fencing facilities and barrier should be set up on the Class I collector highway.
Czech Republic	All median divided roads are equipped with the median guardrails. The overtaking risk stretches on two-lane roads are equipped with relevant traffic signs and road marking.
Denmark	See link to road safety plan mentioned before.
Estonia	We don't have specific policies nor programmes addressing the certain collision type or road safety problem. We have goals for some interventions (e.g. rumble strip, guardrails, cycle paths etc) in Estonian Road Administration inner strategy. Besides we have certain actions in Road Safety Programme Action Plan and many technical guidelines (e.g. road barrier guideline, road markings guideline, obstacle free and safe roadsides etc), addressing all the issues below. As it was mentioned above the safety issue cut across all these guidelines.
Ethiopia	
France	
Germany	creating a network depending on road functions an volume of traffic installing mediums with crash barriers regarding to guidelines
Hungary	motorway and speedway developments,
India	
Indonesia	
Italy	
Lithuania	
Malaysia	a) Provide suitable physical median at appropriate location/stretch.
Mali	
Mexico	Separation of spaces, barriers (rigid, semi-rigid and flexible) and retaining walls (road restraint systems), demarcations, lane separator paint (yellow for the left side). This is established in the following documents: - Investment Program in Transportation and Communications Infrastructure of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/GITS/PIITC_-_SCT.pdf); - Geometric road project manual of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/proyecto_g/MPGC_2016.pdf); - Manual of road signs and safety devices of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/NUEVO-SENALAMIENTO/manualSenalamientoVialDispositivosSeguridad.pdf); - Official Mexican Standard NOM-034-SCT2-2011, Horizontal and vertical road and urban road signs of 2014 (http://dof.gob.mx/nota_detalle.php?codigo=5220002&fecha=16/11/2011). - Official Mexican Standard NOM-037-SCT2-2012, Barriers to protect roads and urban roads (http://normas.imt.mx/NOMs/NOM-037-SCT2-2012.pdf).
Morocco	For express lanes and given the speed adopted (100 km / h), T.P.C is used to avoid frontal accidents.
Netherlands	Guidelines for safe road design suggest a median treatment (barrier, central reservation) in case the speed limit is 70km/h or higher.

Norway	National target: Percentage of motor vehicle traffic on national roads with speed limits of 70 km/h or higher on roads with median barriers: 54, 1 % per 1/1-2022 Directive 2008/96/ec of the European parliament and of the Council of 19 November 2008 on road infrastructure safety management (Vegsikkerhetsforskriften) Handbook on Road design, handbook on Traffic safety revisions and inspections (https://www.vegvesen.no/fag/publikasjoner/handboker)
Poland	
Portugal	Installation of median road restrain systems in roads with dual carriageways or roads with two or more lanes of traffic
South Africa	Median Barriers / Dual Carriageway Designs
Sweden	Motorways with separation of traffic flow and 2+1 roads on major roads with high traffic volume (this is an ongoing development in all regions of Sweden).
Switzerland	
Thailand	Construct barrier to separate traffic.
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Centreline rumble stripes; high friction surface treatment; median barrier. For more information: https://safety.fhwa.dot.gov/roadway_dept/

Table 6a (2) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target Run-Off-Road Collisions*

Country	Strategy
Australia	Roadside barriers – prefer WRSB, shoulder sealing, median protection, clear zones (although this is being replaced by barrier systems as the preferred option).
Austria	Roadside Management
Belize	Crash barriers – effective end treatments. Sand bars – local /cheaper solutions where appropriate.
Chile	
China	In the industrial standard named Specification for Design of Highway Safety Facilities, it is regulated that Measures shall be taken for the sake of roadside safety where clear recovery zone width does not reach the standard.
Czech Republic	The hazardous stretches strictly defined in the relevant road standard are equipped with guardrails. See standard ČSN 736101 – Design of roads and motorways
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	
Germany	crash barriers in front of obstacle creating obstacle free zones speed reduction in case of obstacles
Hungary	replacement of guard rail to better retention rate example H2, H3
India	
Indonesia	There is a guideline for Road side hazard management as a part book 2 of road safety engineering manual (DGH). However, is not really be implemented
Italy	
Lithuania	Study for roadside safety improvement, 2012.
Malaysia	Provision of a clear zone; where items (hazards) such as unprotected drains, steep embankment, and overhead sign support, sign post, lighting pole etc should be either relocated or removed outside of the clear zone. If it is not practicable and the consequences of hitting hazards are worse than hitting the barrier, barrier protection should be provided.
Mali	
Mexico	alert band (roar), containment systems (road restraint systems in general), delimitations (buoys or vialets) and paint (white for the right side). This is established in the following documents: - Investment Program in Transportation and Communications Infrastructure of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/GITS/PIITC_-_SCT.pdf); - Geometric road project manual of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/proyecto_g/MPGC_2016.pdf); - Manual of road signs and safety devices of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/NUEVO-SENALAMIENTO/manualSenalamientoVialDispositivosSeguridad.pdf); - Official Mexican Standard NOM-034-SCT2-2011, Horizontal and vertical road and urban road signs of 2014 (http://dof.gob.mx/nota_detalle.php?codigo=5220002&fecha=16/11/2011). - Official Mexican Standard NOM-037-SCT2-2012, Barriers to protect roads and urban roads (http://normas.imt.mx/NOMs/NOM-037-SCT2-2012.pdf).
Morocco	If the use of road safety indicators shows accumulations of accidents in areas, inspection missions are organized and their recommendations (improvements, signage, etc.) are translated into an action plan to be implemented.
Netherlands	
Norway	Percentage of the national road network with a speed limit of 70 km/h or higher that meets the minimum requirements of the NTP 2014–2023 when it comes to preventing serious runoff-the-road accidents: 1500 km within 2023 Directive 2008/96/ec of the European parliament and of the Council of 19 November 2008 on road infrastructure safety management (Vegsikkerhetsforskriften) Handbook on Road design and handbook on Traffic safety revisions and inspections (https://www.vegvesen.no/fag/publikasjoner/handboker)

Poland	
Portugal	Implement road shoulder rumble strips/sleep line/alert strips, install road restrain systems, elimination or protect with road restrain systems of dangerous obstacles (trees, public lighting poles, electricity poles, etc)
South Africa	6 metre recovery zone
Sweden	Side barriers and fences on major roads and “clean areas” surrounding major road systems (highways)
Switzerland	
Thailand	Install roadside barrier
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Edgeline and Shoulder Rumble Strips; High Friction Surface Treatment; Safety Edge; Curve Delineation; Clear zone improvements and maintenance; barriers; for more information: https://safety.fhwa.dot.gov/roadway_dept/

Table 6a (3) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target Intersection Collisions*

Country	Strategy
Australia	Roundabouts, raised intersection, low speed environments
Austria	No use because there are no intersections on motorways
Belize	Installation of new roundabouts has certainly reduced traffic conflicts and traffic collisions.
Chile	
China	Supported by a scientific project related to 12th Five Year Plan, in Lishui City (Zhejiang Province), a modern roundabout is built. The original intersection is changed to a small roundabout intersection, which basically maintains the original road elevation. A two-way road hump is built to solve the original safety problem.
Czech Republic	Safe design of intersection is included in the relevant design standard ČSN 736102 – Design of road intersections. More detailed evaluation of safety parameters are treated by the guidelines for road safety audits and inspections.
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	Guide cerema de la vorie, guide cerema urban crossroads Work on visibility and readability, on approach speed, roundabout, compact or mini, roundabout, plateau, lock, motion removal, baffle, with storage rotates left
Germany	designing intersections depending on traffic amount and traffic streams in dependence of road types Vulnerable road user crossing/moving along road
Hungary	reconstruction for roundabout or " turbo " roundabout
India	
Indonesia	
Italy	
Lithuania	Intersection improvement plan, 2015.
Malaysia	Design the intersection accordingly where by, various sight distance requirement (stopping sight distance, entering sight distance and safe intersection sight distance) have to comply with current manual/ATJ. The general layout features need to cater safely for all road users.
Mali	
Mexico	Vertical and horizontal signalling, logarithmic lines (demarcations). This is established in the following documents: - Investment Program in Transportation and Communications Infrastructure of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/GITS/PIITC_-_SCT.pdf); - Geometric road project manual of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/proyecto_g/MPGC_2016.pdf); - Manual of road signs and safety devices of the Ministry of Communications and Transportation of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/NUEVO-SENALAMIENTO/manualSenalamientoVialDispositivosSeguridad.pdf); - Official Mexican Standard NOM-034-SCT2-2011, Horizontal and vertical road and urban road signs of 2014 (http://dof.gob.mx/nota_detalle.php?codigo=5220002&fecha=16/11/2011).
Morocco	We have technical standards/catalogue for the layout of intersections. However, if the use of road safety indicators shows accumulations of accidents in areas, inspection missions are organized and their recommendations (adjustments, signage ...) are translated into an action plan at achieve.
Netherlands	Guidelines suggest to lower the speed on intersections, for example by means of roundabouts or raised junctions.
Norway	Building roundabouts Handbook on Road design (https://www.vegvesen.no/fag/publikasjoner/handboker)
Poland	
Portugal	Intersections transformation to roundabouts
South Africa	Roundabouts where feasible Auxiliary lanes / Turning lanes Protected Right lanes
Sweden	Construction of roundabouts at all major intersections in both urban and rural areas (a development work going on for the last 2 decades)
Switzerland	
Thailand	Channelization, Install traffic signal.

Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Systemic application of multiple low cost countermeasures at stop-controlled intersections; reduced left turn conflict intersections; back plates with retroreflective borders; dedicated left and right turns at intersections; roundabouts; yellow change interval For more intersection countermeasures: https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa09020/ http://www.ite.org/uiig/

Table 6a (4) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* Vulnerable Road User Collisions

Country	Strategy
Australia	Footpaths, raised crossings, signalised crossings, low speed environments
Austria	There are no accumulations on motorways
Belize	Installation of raised crosswalks, especially near schools and bus stops. New designs for accommodating walkers/joggers and bicycles on separate paths adjacent to the vehicle travel lanes. Speed bumps where appropriate.
Chile	
China	In a scientific project related to 12th Five Year Plan, the consideration for vulnerable road user crossing/moving along road is taken and following regulation is made. The driver shall decelerate actively 30 meters ahead of reaching the zebra crossing with the effect of speed hump, signs and markings. Through the field survey data analysis, the spot speed can be effectively controlled below the speed limit of 40km/h, which greatly improves the safety of pedestrians when they cross the street.
Czech Republic	There are clear and strict rules to secure safe movement of pedestrians on roads given by the design standard ČSN 736110 – Design of local roads. Specific pedestrian treatments are supported by the several technical guidelines approved by the Ministry of Transport.
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	Guide cerema de la vorie Cheminement le long, trottoir Passages piétons plus ou moins avec mesures physiques contraignantes (ilot pour réduire la largeur e traversée, ralentisseur, coussins, plateaux, feu piéton spécifique
Germany	zebra crossings, pedestrian islands, traffic lights for pedestrians
Hungary	
India	
Indonesia	
Italy	
Lithuania	Rules for pedestrian crossing type identification, 2016.
Malaysia	Pedestrian walkway in area where there are high pedestrian walking activities.
Mali	
Mexico	In federal highways, not that we are aware of. However, there are different regulations at the subnational level to protect vulnerable road user safety in urban areas.
Morocco	Depending on the case, if the use of road safety indicators shows accumulations of accidents in zones, inspection missions are organized and their recommendations (improvements, signage, etc.) are translated into an action plan. to achieve
Netherlands	separate bicycle paths in case the speed limit is 50km/h or higher, various crossing types for cyclists and pedestrians
Norway	In the Plan period 2018-2021, particular measures will be implemented for pedestrians and cyclists: - on approx. 165 km of the national road network - on approx. 230 km of the county road network
Poland	Program called: Program for the construction of pavements and bicycle walkways
Portugal	Construction of sidewalks, bike paths, dedicated pedestrian road crossing
South Africa	Grade separation, Sidewalks, footpaths Lighting
Sweden	Construction of safe crossings (elevated walk and cycle paths, speed reductions, road constriction etc.)
Switzerland	
Thailand	Construct Pedestrian crossing bridge
Uganda	Very few exist such pedestrian crossings and bridges such as at Nakawa on Jinja Road and Kajjansi on Entebbe Road and the pedestrian crossing and General Post Office on Kampala Road. NMT Policy exists but no NMT infrastructure guidelines to support its implementation.
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	HAWK Signal High Visibility Crosswalks Leading Pedestrian Interval Pedestrian Hybrid Beacon Walkways Road Diet For additional pedestrian countermeasures: http://www.pedbikesafe.org/PEDSAFE/countermeasures.cfm

Table 6a (5) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* Speed-Related Collisions

Country	Strategy
Australia	Lower speed limits, reinforced by infrastructure in residential areas, shopping strips, school zones, high risk rural areas.
Austria	Speed Enforcement if there is a crash rate higher than the average (and if other measures do not help to lower the rate); Section control if there is need in tunnels (referring to risk analysis)
Belize	Speed humps. Static and mobile speed awareness signs.
Chile	In cities, we are using "Zonas 30", which are areas at which the speed limit is 30 km/h. It is applied case by case in cities after a discussion between the City Authority ("Alcalde") and the technical team of the Regional office of the Ministry of Transportation. The "Zonas 30" are not included in the Traffic law or in standards.
China	In 2015, a speed restriction plan is made for improving safety of S108 Road, S109 Road, S417 Road and S206 Road in Chongqing City. With the risk evaluating technologies, the plan is formed on the basis of network capacity and safety. In 2016, the plan is wholly implemented.
Czech Republic	There are several technical guidelines recommending measures to reduce speeding (traffic calming measures, speed humps, residential areas , Zones 30, etc.)
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	Guide to the cerema road network Crews tray baffles locks, bi-directional bicycle
Germany	speed depending design, by roundabouts an important reduction of accidents at intersections has been achieved, road islands at the entrance ov villages and towns and pedestrian Island within build up areas are very effective on speed reduction.
Hungary	the power of local government of Speed reduction at schools, centre
India	
Indonesia	
Italy	
Lithuania	Speed cameras programme.
Malaysia	Lower speed limit/zone is to be introduced in residential area, school area and area where there are complex traffic manoeuvres and conflict especially in highly developed area.
Mali	
Mexico	Setting of speed limits, implementation of radars and speed reducers, vertical and horizontal signage, luminous signals (traffic lights of a preventive nature). This is set out in the following documents: -General Human Settlements Act (http://www.diputados.gob.mx/LeyesBiblio/pdf/LGAHOTDU_281116.pdf). -Road Design Manual of the Ministry of Agrarian, Terriotorial and urban development. -Law of roads, bridges and federal AutoTransport (http://www.sct.gob.mx/obrapublica/MarcoNormativo/3/3-1/3-1-6.pdf) and the transit regulations on roads and bridges of federal jurisdiction (http://dof.gob.mx/nota_detalle.php?codigo=5278684&fecha=22/11/2012)-For speed control theme. -Manual of road signs and safety devices of the Secretariat of Communications and Transport of Mexico (http://www.sct.gob.mx/fileadmin/DireccionesGrales/DGST/Manuales/NUEVO-SENALAMIENTO/manualSenalamientoVialDispositivosSeguridad.pdf); -Official Mexican Standard
Morocco	We have guides / guidelines / reference for the speed limitation and the security arrangements that result from this in particular the reference guide for the development of road safety in urban areas. Inspection missions are organized and their recommendations (improvements, signage, etc.) are translated into an action plan to be implemented.
Netherlands	30km/h zones
Norway	Speed Cameras (Automatic Speed Enforcement)

Poland	
Portugal	Speed traffic lights, roundabouts
South Africa	Traffic calming
Sweden	Speed restriction zones in urban areas (30 km/h), at crossings etc. (low speed zones in city areas, 8 km/h)
Switzerland	
Thailand	restrict speed in residential, commercial and school zones
Uganda	Most highways and urban roads have speed control humps and rumble strips.
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Traffic Calming Measures (https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm) Reduce lane width on intersection approach Road Diet Roundabout Transverse rumble strips Converging Chevrons Optical speed bars Speed enforcement campaigns Variable speed limits Dynamic Speed Feedback Signs USLimits2 – A tool to aid practitioners in setting appropriate speed limits (https://safety.fhwa.dot.gov/uslimits/) Additional information on many of these measures can be found in the Speed Management Toolkit. https://safety.fhwa.dot.gov/speedmgt/ref_mats/docs/speedmanagementtoolkit_final.pdf

Table 6b (1) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Pedestrian Collisions**

Country	Strategy
Australia	Lower speed limits, vehicle free zones, separation.
Austria	No use on motorways
Belize	Some municipalities already have car-free days.
Chile	
China	Since 2016, the upgrading of 3rd ring road has carried out in Beijing. According to the research carried out before and after the implementation of the upgrading, it shows that the traffic volume of pedestrians has increased by 4.42%.
Czech Republic	Compulsory use of reflective elements for pedestrians walking roads outside built-up areas was introduced by the Act since January 1, 2016. Practically a continuous campaign is running since late 2015 under the logo "Vidíme se" (We see each other). Stricter enforcement on the high risk pedestrian crossings was introduced by police. Concentrated surveillance on the pedestrian crossings near schools is running during school-start and school-end hours.
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	Evolution of the pedestrian code of the road: priority relative to the pedestrian manifesting the intention to cross, increase of the fines parking on pedestrian path, neutralization parking of the motorized vehicles upstream of the pedestrian crossings (recommendation), encouragement of the lowering of the speeds in urban areas' (recommendation) Many communities have policies to develop the march safely: pedestrian plan of Strasbourg, pedestrian strategy of Paris ... facilitate the crossings, treat the urban cuts, redistribute the public space ...
Germany	traffic education in the first school classes
Hungary	Road safety training program for school, and local government
India	
Indonesia	
Italy	
Lithuania	
Malaysia	School crossing patrols at schools, Road Safety Education in schools, Long Short Walk Program, Road Safety Treasure Hunt
Mali	
Mexico	This is established in the following documents at the national level: Specific Action Program: Road Safety 2013-2018 (https://www.gob.mx/salud/documentos/programa-de-accion-especifico-pae-seguridad-vial- 2013-2018? State = published), the National Road Safety Strategy 2011-2020 (http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011); and subnational: Mobility and Transportation Law of the State of Jalisco (https://semov.jalisco.gob.mx/proyectos/ley-de-movilidad), Mobility Law of the Federal District (now Mexico City) (http: / /www.aldf.gob.mx/archivo-ba20960fb6570ec7d4ee34c30ee2d733.pdf) and the Paso Seguro program in Mexico City (http://www.aep.cdmx.gob.mx/programas/programa/pasos-seguros).
Morocco	The five-year road safety action plan on the "safer roads" resulting from the implementation of the 2017-2026 national road safety strategy contains actions dedicated to pedestrians (construction of footbridges, signaling, pedestrian crossings, .. .).
Netherlands	pedestrian crossings, pedestrian zones
Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf)
Poland	We have some individual programs in cities
Portugal	
South Africa	NMT Policies Pedestrian & Public Transport
Sweden	We have a dedicated strategy for all groups of vulnerable road users: pedestrians, cyclists, moped and MC, etc.(see enclosed strategy documents).
Switzerland	
Thailand	Construct footpath in community.
Uganda	However, NMT Policy addresses how we should have facilities for this group but implementation is NIL to date
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)

US	Pedestrian Safety Enforcement: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812059-pedestriansafetyenforceoperahowtoguide.pdf PEDSAFE: http://www.pedbikesafe.org/PEDSAFE/ Complete Streets (https://smartgrowthamerica.org/program/national-complete-streets-coalition/) USDOT policy statement on Bicycle and Pedestrian Accommodation Regulation and Recommendation (https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm) For more information: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/

Table 6b (2) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Bicycling Collisions**

Country	Strategy
Australia	Off road bicycle paths, on road protected paths (e.g. Copenhagen style), on road non-protected
Austria	No use on motorways
Belize	In some communities
Chile	The local authorities in many cities are implementing bike ways networks at different levels: master plans, design and construction.
China	Since 2016, the upgrading of 3rd ring road has carried out in Beijing. According to the research carried out before and after the implementation of the upgrading, it shows that motor vehicle occupation rate has decreased from 18.24% to 6.13%, which has dropped by 12.11%. With the rise of shared bicycles and the improvement of facilities, and the traffic volume of non motorized vehicles has increased by 51.85%.
Czech Republic	National Cycle Development Strategy of the Czech Republic was approved by the Government on May 22, 2013, and covers all aspects of cycling, including safety. System based education of children on road traffic is the integrated part of the education program. Practical training is provided on the traffic playgrounds. Annual competition "Young bicyclist" is organised on the local, regional and national level with a final participation in the international European contest. The Czech team reached the 5th place in 2017.
Denmark	
Estonia	
Ethiopia	
France	Regulatory evolutions: two-way cycling obligation in a calmed traffic zone, give way to traffic and have a bicycle in the fire. National bike plan in preparation to achieve a modal share of 9% for urban cycling Many large urban communities have proactive cycling policies with modal targets and reduced accidentality. More than 68 departments out of 101 (interurban network) have a cycling policy related to the cycle tourism but also to the daily bicycle for a part. These policies define specific budgets and investment plans to develop cycling safely with an infrastructure component but also education and mobility (bike rental, service book ...) ...
Germany	Bicycle lanes in the capital Berlin and along interurban roads have made bicycle riding much safer
Hungary	Safety cycling program for school
India	
Indonesia	
Italy	
Lithuania	
Malaysia	Advocacy on safety tips for cyclists (infographics) in social media, safety talk and infrastructure improvement.
Mali	
Mexico	This is established in the following documents at the national level: Specific Action Program: Road Safety 2013-2018 (https://www.gob.mx/salud/documentos/programa-de-accion-especifico-pae-seguridad-vial- 2013-2018? State = published), the National Road Safety Strategy 2011-2020 (http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011), the document "More cyclists, more secure. Guide for interventions for the prevention of injuries in urban cyclists "(https://www.gob.mx/salud/documentos/mas-ciclistas-mas-seguros-guia-de-intervenciones-para-la-prevencion-de-lesiones -in-urban-cyclists).
Morocco	The five-year road safety action plan on "safer roads" resulting from the implementation of the 2017-2026 National Road Safety Strategy contains actions dedicated to 2/3 wheels (development of bicycle lanes).
Netherlands	various crossing types, bicycle paths along roads, solitary bicycle paths,
Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf) In the Plan period 2018-2021, particular measures will be implemented for pedestrians and cyclists: - on approx. 165 km of the national road network - on approx. 230 km of the county road network Handbook on bicycles (https://www.vegvesen.no/fag/publikasjoner/handboker)
Poland	We have some individual programs in cities
Portugal	

South Africa	NMT Policies National department of Transport
Sweden	See enclosed strategy document!
Switzerland	
Thailand	
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	BIKESAFE: http://www.pedbikesafe.org/BIKESAFE/ Resources listed under Pedestrians would also apply.

Table 6b (3) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Motorcyclist Collisions**

Country	Strategy
Australia	Do have some 'blackspot' programs for motorcycle routes; enhanced maintenance regimes etc.
Austria	
Belize	However we have had successful campaigns in getting riders to wear a fastened helmet.
Chile	
China	In 2012, the thematic research concerning motocycle's safety named Motorcycle And Electric Powered Vehicle Development Policy and Research On Road Traffic Safety is set up in Shanghai transport white paper. Research pointed out that at present in China motocycle's safety improvement faces three difficulties: the confliction between vehicle technical standards and the law and between the market tendency and government supervision; the poor riding rules consciousness and the lack of effective management system, and insufficient non-motorized traffic resources.
Czech Republic	A variety of activities are organized annually especially in spring at the start of the motorcycle season, especially at regional and local level. The hazardous curves with the frequent occurrence of run-off road crashes are step by step equipped with special guardrails against underrun.
Denmark	See link to road safety plan mentioned before.
Estonia	
Ethiopia	
France	State level this goes through the evolution of the regulations to try that the 2WD that largely pass by the control system can be treated equally with other vehicles. But also by the renovation of the current 2WD driving license, taking into account the 2WD in the theoretical examination for the driving of an automobile And campaigns on the safety of 2WD to all users Variable community level Toulouse metropolis has a Mr Moto, which is dedicated to the agglomeration's policy to reduce mortality and cycling accident. By a system of treatment of infrastructure deficiencies by the 2RM, by actions of the preventions towards the target publics of which 2WD circuit Information sheet
Germany	there are no motorcycle lanes in Germany
Hungary	
India	
Indonesia	
Italy	
Lithuania	
Malaysia	Provide segregated lanes (exclusive and non-exclusive), safety talk and advocacy campaigns to bikers groups, school students, NGO and also enforcement.
Mali	
Mexico	This is established in the following documents at the national level: Specific Action Program: Road Safety 2013-2018 (https://www.gob.mx/salud/documentos/programa-de-accion-especifico-pae-seguridad-vial- 2013-2018? State = published), the National Road Safety Strategy 2011-2020 (http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011), the document "Intervention Model for the prevention of motorcycle injuries ".
Morocco	The five-year road safety action plan on the "safer roads" resulting from the implementation of the 2017-2026 national road safety strategy contains actions dedicated to two-wheelers (development of cycle lanes).
Netherlands	protection on guide rails, humps and other speed reducing measures that will not cause skidding.

Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf) National strategy for motorcycles and mopeds 2014-2017 (https://www.atl.no/images/Nasjonal_strategi_for_motorsykkel_og_moped_2014-2017.pdf) National strategy for motorcycles and mopeds 2018-2021 (forthcoming)
Poland	
Portugal	
South Africa	Not sure
Sweden	See enclosed strategy document!
Switzerland	
Thailand	
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	State specific helmet laws Education & outreach campaigns Motor Cycle Advisory Council sponsored by FHWA as required by law. More information about motorcycle safety: FHWA: https://safety.fhwa.dot.gov/motorcycles/ NHTSA: https://www.nhtsa.gov/road-safety/motorcycle-safety

Table 6b (4) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Vehicle Occupant Collisions**

Country	Strategy
Australia	General safety programs address these
Austria	Road Safety campaigns, Traffic Education
Belize	We have had integrated campaigns to ensure people buckle up in the front and the back. Currently the legislation is a little weak in this area. You only need to buckle up when riding on the highway. While we wait for a change in legislation we advocate to wear a seat belt – it's the right thing to do!
Chile	the use of seat belt is mandatory for all the occupants of vehicles, as well as reflective jackets, special seats for child up to 12 years is mandatory too.
China	The Regulations On Training And Management Of Motor Vehicle Drivers is issued by the Ministry of Transport after revision on April 2016. In the regulations, the management and supervision of vehicle occupants is specified. Moreover, to strengthen the administration of motor vehicle drivers and driving license, maintaining road traffic order, to ensure the safety of road traffic, according to the law Of Road Traffic Regulations On The Administration Of The Relevant Provisions of the People's Republic of China, it is formulated the Administration Regulation Of Motor Vehicle Driving License Of The People's Republic Of China.
Czech Republic	Wearing safety belts and use of child seats are the regular topic of safety campaigns on national, regional and local level.
Denmark	
Estonia	
Ethiopia	
France	Classic Communication Campaigns on Front Back Belt
Germany	screens on roads showing safety aspects
Hungary	
India	
Indonesia	
Italy	
Lithuania	
Malaysia	Advocacy and enforcement on seat belts wearing, advocacy to parents on child seat usage.
Mali	

Mexico	This is established in the following documents at the national level: EESpecific Action Program: Road Safety 2013-2018 (https://www.gob.mx/salud/documentos/programa-de-accion-especifico-pae-seguridad-vial- 2013-2018? State = published), the National Road Safety Strategy 2011-2020 (http://dof.gob.mx/nota_detalle.php?codigo=5193284&fecha=06/06/2011), Law of Roads, Bridges and Autotransporte Federal (http://www.sct.gob.mx/obrapublica/MarcoNormativo/3/3-1/3-1-6.pdf) and the Traffic Regulations on roads and bridges of federal jurisdiction (http: // dof.gob.mx/nota_detalle.php?codigo=5278684&fecha=22/11/2012) -for the issue of speed control.
Morocco	
Netherlands	No additional requirements next to the European regulations for vehicles.
Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf)
Poland	
Portugal	
South Africa	Front and Rear seatbelt use
Sweden	This is included in the ongoing international strategy with EuroNCAP and in collaboration with the automotive industry in Sweden
Switzerland	
Thailand	
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Seat Belts (https://www.nhtsa.gov/risky-driving/seat-belts) Car Seats and Booster Seats: (https://www.nhtsa.gov/equipment/car-seats-and-booster-seats) Air bags (https://www.nhtsa.gov/equipment/air-bags)

Table 6b (5) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Heavy Vehicle Collisions**

Country	Strategy
Australia	Restricted access to areas
Austria	Sites for heavy vehicles to control technical state, speed driven by automatic on board control
Belize	This continues to be a challenge with overloaded trucks. It is addressed in the RSMP2030. Looking to introduce weigh stations.
Chile	
China	The Regulations On Dynamic Supervision And Administration Of Road Transport Vehicles is issued by the Ministry of Transport, Ministry of Public Security and State Administration of Work Safety after revision on April 2016. It is the latest policy in the road transport industry. It strengthens the informationization process of security management, which is more detailed and operable than previous policies. At the same time, road transport enterprises have put forward higher, newer and more practical requirements for satellite navigation operators in years of practice.
Czech Republic	The majority of activities are organised by the transport companies, particularly by ČESMAD BOHEMIA, the Association of Road Transport Operators, the largest association for domestic and international operators of freight and passenger road transport in the Czech Republic. According to the Act No. 247/2000 Coll. (Act on the acquisition and improvement of professional competence for driving motor vehicles and on amendments to some laws) are the drivers of heavy good vehicles obliged to pass every year the course that includes safety as well.
Denmark	in regard to road crashes with bicycles
Estonia	
Ethiopia	
France	Mandatory, initial and continuous training including security features
Germany	screens on roads showing safety aspects
Hungary	
India	
Indonesia	
Italy	
Lithuania	
Malaysia	Enforcement to drivers and bus operators/trucks,etc. Advocacy through safety talk and campaigns to heavy vehicles drivers and their operators (the usage of safety triangle and MS828 SIRIM-certified marking materials – Light reflector and etc.). ICOP Safety Training

	Program by the SPAD.
Mali	
Mexico	This is established in regulations such as the "Official Mexican Standard NOM-012-SCT-2-2017, Regarding the weight and maximum dimensions with which the motor carrier vehicles that transit in the general communication channels of federal jurisdiction can circulate" (http : //www.dof.gob.mx/nota_detalle.php? code = 5508944 & date = 26/12/2017), in the Law of Roads, Bridges and Federal Autotransportations (http://www.sct.gob.mx/obrapublica /MarcoNormativo/3/3-1/3-1-6.pdf) and the Traffic Regulations on roads and bridges of federal jurisdiction (http://dof.gob.mx/nota_detalle.php?codigo=5278684&fecha=22/ 11/2012) -for the issue of speed control.
Morocco	The 2017-2026 national road safety strategy contains actions dedicated to heavy goods vehicles and professional driving. The five-year road safety action plan on "safer roads" resulting from the implementation of this strategy contains actions dedicated to heavy goods vehicles (bicycle lane development).
Netherlands	requirements to prevent blind spot crashes
Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf)
Poland	
Portugal	
South Africa	Speed restriction of 80 km/h for heavy motor vehicles
Sweden	This is included in the ongoing collaboration with the automotive industry in Sweden (Volvo and Scania)
Switzerland	
Thailand	
Uganda	
UK	Through the Safer Roads Fund (DfT programme for 50 highest risk A roads in England)
US	Commercial motor vehicles are heavily regulated in the US by the Federal Motor Carrier Safety Administration for things such as: License Requirements Medical Requirements Vehicle Requirements/Inspections Hours of Service for Truck Drivers For more info: https://www.fmcsa.dot.gov/ FHWA also developed a Motorcoach Roadway Safety Assessment Tool for States and industry professionals to use to identify and evaluate the safety of rural routes that are utilized by motorcoaches. https://safety.fhwa.dot.gov/rsat/ Federal size and weight standards: https://ops.fhwa.dot.gov/Freight/sw/index.htm

Table 6b (6) – *Infrastructure Strategies, Policies, Programs, Guidelines to Target* **Connected Vehicle Collisions**

Country	Strategy
Australia	
Austria	
Belize	I think we're a long way from that!
Chile	
China	Beijing Municipal Committee, Municipal Public Security Bureau, Municipal Economic Informatization Committee jointly formulate the Guidance Of The Work About Accelerate The Autonomous Vehicle Road Test (On Trial) and the Implementation Guideline Of Autonomous Vehicle Road Test Management (On Trial) and they are issued in December 2017.
Czech Republic	
Denmark	
Estonia	
Ethiopia	
France	
Germany	
Hungary	This is a new area, Now we has preparing the design to new highway for testing autonomous vehicles
India	

Indonesia	
Italy	
Lithuania	
Malaysia	Current stage : Established 4 Sub-Committees (Law & Regulations, Infrastructure, Capacity Building, Technology & Standards) to discuss, identify, coordinate and prepare preliminary reports on the implementation of Autonomous Vehicles (AV) technology in Malaysia.
Mali	
Mexico	
Morocco	
Netherlands	are allowed after approval by the national government (preceded by an extensive procedure regarding all technical and safety issues)
Norway	National Plan of Action for Road Traffic safety 2018-2021 (https://www.vegvesen.no/_attachment/646945/binary/968554?fast_title=National+Plan+of+Action+for+Road+Traffic+Safety+2014%E2%80%932017+%28short+version%29.pdf)
Poland	
Portugal	
South Africa	
Sweden	This is included in the ongoing international strategy with EuroNCAP and in collaboration with the automotive industry in Sweden. Recently the EuroNCAP system has included active safety systems in the evaluation of vehicle safety.
Switzerland	
Thailand	
Uganda	
UK	Lots of work ongoing in UK regarding semi-autonomous vehicles – though little preparation of the road infrastructure to support active safety systems that might rely on road markings/intelligent road studs etc.
US	Notice of proposed rulemaking on V2V Communications https://www.nhtsa.gov/press-releases/us-dot-advances-deployment-connected-vehicle-technology-prevent-hundreds-thousands Additional information is available at: https://www.its.dot.gov/index.htm

Table 7a: *Self-Assessment of Progress Toward a Safe System / Zero Vision Approach by Country*

Country	Not started	Just started	Making progress	Well advanced	Fully Implemented
Australia			x		
Austria					x
Belize			x		
Chile		x			
China				x	
Czech Republic			x		
Denmark				x	
Estonia			x		
Ethiopia		x			
France				x	
Germany				x	
Hungary	x	x			
India	x				
Indonesia			x		
Italy			x		
Lithuania			x		
Malaysia			X		
Mali	x				
Mexico			x		
Morocco			x		
Netherlands				x	
Norway				x	
Poland	x				
Portugal		x			
South Africa		x			
Sweden				x	
Switzerland			x		
Thailand		x			
Uganda	x				
UK			x		
US			x		

Table 7b: *Targeted Collision Types Associated with Road Safety Policies by Country*

Country	All crashes (fatal, injury and non-injury)	Injury crashes (fatal, serious and minor injury)	Crashes for specific target groups (pedestrian, motorcyclists,…)	Fatal and Serious Injury	Fatalities	Other
Australia				x		
Austria	x					
Belize	x		x			
Chile				x		
China	x	x		x	x	
Czech Republic			x	x		
Denmark			x	x		
Estonia				x		
Ethiopia	x	x		x	x	
France		x	x		x	
Germany	x	x	x	x	x	
Hungary				x		
India					x	
Indonesia	x		x		x	
Italy			x	x		x
Lithuania					x	
Malaysia			x	x	x	
Mali	x	x	x	x	x	
Mexico				x		
Morocco			x	x	x	
Netherlands				x		
Norway				x		
Poland					x	
Portugal				x		
South Africa			x	x		
Sweden				x		
Switzerland				x		
Thailand	x					
Uganda	x					
UK			x	x		
US				x		

Table 7c: *Public Entities Responsible for Reducing Death and Serious Injury on the Road by Country*

Country	Road users	Road Designers and managers	Emergency service providers	Police	Vehicle manufacturers	Other
Australia	x	x	x	x	x	
Austria	x	x		x	x	
Belize	x	x	x	x	x	x
Chile		x		x		
China		x		x		
Czech Republic						x
Denmark	x	x	x	x		x
Estonia	x	x	x	x		
Ethiopia	x	x		x		
France	x	x	x	x	x	
Germany	x	x	x	x	x	x
Hungary				x		
India	x	x				
Indonesia		x	x			
Italy		x		x		
Lithuania		x	x	x		x
Malaysia	X	X	X	X	X	x
Mali	x	x		x		x
Mexico						x
Morocco	x	x				x
Netherlands	x	x	x	x	x	x
Norway	x	x	x	x	x	x
Poland		x	x	x		
Portugal	x	x	x	x	x	
South Africa	x	x	x	x	x	
Sweden		x				
Switzerland	x	x	x	x	x	
Thailand	x	x			x	
Uganda				x		x
UK						x
US	x	x	x	x	x	

Table 7d: *Initiatives with the Greatest Reduction in Deaths and Serious Injury by Country*

Country	Improved road user behaviour	Better/safe roads	Improved vehicles	Improved emergency response	More appropriate vehicle speeds	A systems approach including all of these	Other
Australia						x	
Austria	x		x		x		
Belize						x	
Chile	x	x			x	x	
China	x	x				x	
Czech Republic						x	
Denmark						x	
Estonia						x	
Ethiopia	x	x			x		
France	X				X	X	
Germany						x	
Hungary	x		x		x		
India	x	x			x		
Indonesia	x	x	x			x	
Italy						x	
Lithuania						x	x
Malaysia	x	x	x	x	x	x	
Mali	x	x	x	x	x		
Mexico						x	
Morocco	x	x			x	x	
Netherlands		x	x			x	
Norway	x		x			x	
Poland	x	x				x	
Portugal						x	
South Africa	x	x			x	x	
Sweden						x	
Switzerland		x	x			x	
Thailand	x	x	x				
Uganda						x	
UK		x	x	x		x	
US	x		x			x	

World Road Association (PIARC)

La Grande Arche, Paroi Sud, 5e étage, F-92055 La Défense cedex

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