



# PIARC Global Road Safety Knowledge Exchange

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Introduction to the PIARC Road Safety Manual

**Cape Town**

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# Introduction

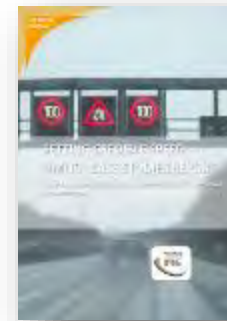
- PIARC Technical Committee 3.1 on Road Safety
- Focused on the reduction of fatal and serious crashes worldwide
- Particular interest in vulnerable road users and LMIC
- Past Cycle: TC 1.1 National Policy and Programmes and TC 1.2 – Design and Operation of Safer Road Infrastructure

# PIARC Global Road Safety Knowledge Exchange



# PIARC's Recent Work on Road Safety

- Report on Implementation of National Safe System Policies: A Challenge
- Road Safety - Catalogue Of Case Studies
- Review of Global Road Safety Audit Guidelines – With Specific Consideration for Low- and Middle-Income Countries
- Report on Road Safety Evaluations Based on Human Factors Method
- Setting Credible Speed Limits - Case Studies Report
- Online Road Safety Manual
- And many more: <https://www.piarc.org/en/activities/PIARC-Directory-Technical-Reports/PIARC-Technical-Reports-Cycle-2016-2019>



# Reports List

- **Manuals:**

- [Road Safety Manual \(2019\)](#)
- [Road Tunnels Manual \(2019\)](#)

- **Technical Reports:**

- [Documents Relevant to Road Infrastructure and Transportation Security \(2022\)](#)
- [Road Safety - Catalogue Of Case Studies \(2019\)](#)
- [Setting Credible Speed Limits - Case Studies Report](#)
- [Implementation of National Safe System Policies: A Challenge \(2019\)](#)
- [Overweight Vehicles: Impact on Road Infrastructure and Safety](#)

- **Seminars and Workshops proceedings, Webinars:**

- [Road Safety in Low and Middle Income Countries \(Tunis, 2021\)](#)
- [Safer road by Infrastructure design and operation \(Kuala Lumpur, 2019\)](#)
- [Policies and Programs for Road Safety Management \(Marrakech, 2017\)](#)
- [Addressing Road Safety Worldwide: Vulnerable Road Users, Human Factors, and Road Safety for Low- and Middle-Income Countries" \(2018\)](#)



# PIARC international workshop: “Policies and Programs for Road Safety Management”

- **90% of world fatalities are in LMICs => Few actions can get big results!**
- A few recommendations for LMICs:
  - **Speed management** (setting appropriate speed limits, traffic calming, ticketing, firm enforcement of speed limits)
  - **Driving license issue** (ensure driving permission for persons who have risk perception, adequate driving skill, safe behaviour and employ defensive driving)
  - **Enforcement** (deterrence legislation for risk factors – seat belt, helmet, drink and drug driving, speed)
  - **Infrastructure safety improvement** (determination of priorities, effective allocation of safety projects, use of assessment techniques – RSI, iRAP)
  - **Insurance cost considerations** (safer vehicles should pay lower premiums; high risk persons should pay more)
  - **Integrated quality data collection** (crash: location, injuries, fatalities ...; non-crash: traffic volume, road and vehicle characteristics)

# PIARC international seminar on: “Road Safety in Low- and Middle-Income Countries: Issues and Countermeasures”

- Adoption of **Safe System Approach** is necessary to prevent fatal and serious crashes.
- LMICs need to develop **strong lead agency, robust set of local guidelines** and regulations and **build road safety expertise**
- Important to carry out **Road Safety Audits** to ensure highway schemes operate as safely as practicable
- Enhance the use of **technology** and improve **Road Safety Data Systems**
- Implement a **comprehensive Road Safety Assessment** throughout the entire design process

# Road Tunnels Manual

- Key principle for road tunnel safety is the **Integrated Approach**, based on the balance between the forecast risk factors and the safety measures.
- Significant incidents in road tunnels are **collisions, fires** and release of dangerous goods.
- The design of tunnels and their operation should **take account of human factors**
- **Measures** implemented should be **well understood** and adopted by the users
- 4 Categories of measures:
  - Measures **preventing** the occurrence of significant incidents and reducing their frequency,
  - Measures **mitigating** the consequences of significant incidents,
  - Measures supporting **self-rescue**,
  - Measures supporting **emergency response**.
- Important to improve safety in **existing tunnels**



# Technical report: “Overweight vehicles: Impact on road infrastructure and safety”

- Overloading is a **common problem in LMICs** due to limited use of WIM (Weigh in Motion) and the largest overloads occur on secondary and rural roads
- Overweight freight vehicles contribute to **greater damage in case of collisions**
- Prevention and mitigation solutions include four steps:
  - **Legislation** – well-formulated legal text with little room for interpretation road users
  - **Prevention and education** – comprehensive information on potential consequences of overloading
  - **Detection and enforcement** – use of both static and movable scales along with law enforcement controls
  - **Penalisation** – financial, operational or institutional penalties.
- **Effective enforcement** of weight limits by deployment of more staff and increase in fines could lead to higher compliance and a decrease in safety risk.

# PIARC Global Road Safety Knowledge Exchange Project

- Aiming to **promote knowledge sharing** through appropriate implementation aids that will reflect previous work of but not limited to PIARC
- Focus on spreading road safety knowledge to **Low- and Middle-Income Countries.**
- With the support of National Technical University of Athens (**NTUA**) and Austrian Institute of Technology (**AIT**)

# PIARC Road Safety Activities

- **Seminars** organised by the Association available online
  - Safer Roads by Infrastructure Design and Operation, 23-27 April 2019
  - Road Safety in Low to Middle Income Countries, 18-20 May 2021



# Current Working Groups

## Technical Committee T.C. 3.1: Road Safety part of ST3:

Bringing worldwide experts together to develop and disseminate knowledge and accepted practices in road Safety

- 3.1.1. Specific road safety issues for LMICs
- 3.1.2. Implementation of proven countermeasures
- 3.1.3. Update Road Safety Audit Guidelines
- 3.1.4. Implications of connected and automated vehicles
- 3.1.5. Update of the Road Safety Manual

# Why a PIARC Road Safety Manual?

- A global crisis of death and serious injury in road crashes
- A largely preventable problem
- Safe Systems Approach is recommended for adoption in all countries
- Leadership and institutional capacity are vital for results
- An urgent development priority

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# Foundation of the Road Safety Manual based on Safe Systems Approach

- Shift from crash prevention in general towards prevent deaths and injuries
- Directly addresses the needs of vulnerable road users and others
- Encourages safety to be designed into developing road networks rather than being considered an afterthought



# PIARC Online Road Safety Manual

- Free of charge
- 3 Main Parts, 12 chapters
- Case studies and links to detailed technical material and other references
- Can be downloaded and printed in chapters
- Aligned with key pillars for the United Nations Decade of Action for Road Safety 2011-2020:

**Pillar 1: Road  
Safety  
Management**

**Pillar 2: Safer  
Roads and  
Mobility**

**Pillar 3: Safer  
Road User**

# Chapter organization

- Key messages for managers
- Key principles for each of the topics
- Discussion to explain the key principles
- Case studies
- Links to detailed technical material and case studies
- Getting started, making progress, and continuing to improve

The screenshot displays the PIARC Road Safety Manual website. The header includes the PIARC logo and the title 'ROAD SAFETY MANUAL: A MANUAL FOR PRACTITIONERS AND DECISION MAKERS ON IMPLEMENTING SAFE SYSTEM INFRASTRUCTURE!'. The navigation menu features 'INTRODUCTION', 'STRATEGIC GLOBAL PERSPECTIVE', 'ROAD SAFETY MANAGEMENT', 'PLANNING, DESIGN & OPERATION', and 'TOOLS'. The main content area is titled '4. THE SAFE SYSTEM APPROACH' and includes a 'KEY MESSAGES' section with the following bullet points:

- The Safe System approach is the most effective way of considering and responding to fatal and serious casualty crash risks on a network.
- This approach is based on an ethical position where it can never be acceptable that people are seriously injured or killed on the network. It provides a set of design and operating principles to guide action on the Journey to the long term elimination goal.
- The long term Safe System goal is the elimination of death and serious injuries on a country's roads.
- The Safe System is being adopted by an increasing number of countries and forms the basis for the UN Decade of Action for Road Safety.
- The Safe System requires strong governmental leadership, as well as the engagement of a wide range of sectors.
- The prime responsibility of a road authority and other agencies is to support road users to reach the end of their trips safely.
- The Safe System is based on well-established safety principles — of known tolerance of the human body to crash forces, speed thresholds for managing crash impact energies to survivable levels, and the capacities of vehicles and forgiving infrastructure to reduce crash impact energy transfers to humans.
- A focus on key crash types occurring on a network helps to identify the role and intervention options for each Safe System element.
- System-wide Intervention strategies are required to avoid fatal and serious injury crash outcomes, including emergency medical care for crash victims.
- There is a shared responsibility between system designers (who design and operate the roads) and road users, for safe travel outcomes on the road network.
- The Safe System approach compels system designers to provide an safe environment, and to consider the combined system as the major factor in crashes rather than the traditional approach that placed most responsibility for safety on the road user.
- The system design and operation must become forgiving of routine human (road user) error.

# PIARC Online Road Safety Manual

A comprehensive resource (<https://roadsafety.piarc.org>)



The screenshot shows the homepage of the PIARC Road Safety Manual. At the top left is the logo for the World Road Association (Mondiale de la Route). The main title is "ROAD SAFETY MANUAL" with the subtitle "A MANUAL FOR PRACTITIONERS AND DECISION MAKERS ON IMPLEMENTING SAFE SYSTEM INFRASTRUCTURE". A green navigation bar contains the following menu items: INTRODUCTION, STRATEGIC GLOBAL PERSPECTIVE, ROAD SAFETY MANAGEMENT, PLANNING, DESIGN & OPERATION, and TOOLS. The main content area features a "WELCOME TO THIS WORLD ROAD ASSOCIATION GUIDE" section, followed by a paragraph about the new Road Safety Manual (RSM) and its alignment with the UN Decade of Action for Road Safety (2011-2020). A bulleted list identifies three pillars: Pillar 1: Road Safety Management; Pillar 2: Safer Roads and Mobility; and Pillar 4: Safer Road Users. Below this is a paragraph about the manual's comprehensive nature and a paragraph about the Safe System approach. A final paragraph states the manual is split into three parts. On the right side, there are three promotional boxes: "ARE YOU A RESEARCHER, A STUDENT OR A PROFESSIONAL?" with a "REGISTER" button; "ACCESS TO THE KEY MESSAGES FOR THE MANAGERS" with a right-pointing arrow; and "GIVE US YOUR FEEDBACK!" with a "SEND" button. A search bar is located in the top right corner of the navigation bar.

**WORLD ROAD ASSOCIATION**  
MONDIALE DE LA ROUTE  
MTC/PAC

**ROAD SAFETY MANUAL**  
A MANUAL FOR PRACTITIONERS AND DECISION MAKERS  
ON IMPLEMENTING SAFE SYSTEM INFRASTRUCTURE

INTRODUCTION STRATEGIC GLOBAL PERSPECTIVE ROAD SAFETY MANAGEMENT PLANNING, DESIGN & OPERATION TOOLS

**WELCOME TO THIS WORLD ROAD ASSOCIATION GUIDE**

**THE NEW ROAD SAFETY MANUAL (RSM) IS DESIGNED TO HELP COUNTRIES AT EVERY STAGE OF INFRASTRUCTURE DEVELOPMENT TO FULFILL ROAD SAFETY OBJECTIVES.**

It is aligned with key pillars for the United Nations Decade of Action for Road Safety 2011-2020:

- **Pillar 1:** Road Safety Management;
- **Pillar 2:** Safer Roads and Mobility;
- **Pillar 4:** Safer Road Users.

This comprehensive resource builds on the broad range of knowledge and experience provided by PIARC in the (1st edition). It includes new thinking on road safety and offers a clear argument on why adopting a Safe System approach is crucial for your country.

The Safe System approach aims for a more forgiving road system that takes human fallibility and vulnerability into account. Under the Safe System approach, everyone (public agencies, automobile manufacturers, road users, enforcement officials, and others) must share the responsibility for road safety outcomes.

The manual is split into three parts and can be downloaded in chapters.

Key principles for each of the topics are included and discussed in the sections, with case studies and links to detailed technical material and other references.

**ARE YOU A RESEARCHER, A STUDENT OR A PROFESSIONAL?**  
CREATE YOUR FREE ACCOUNT TO ACCESS THE ADDITIONAL MEDIA MATERIALS AND RECEIVE ALERTS WHEN NEW CONTENTS ARE PUBLISHED.  
REGISTER

» ACCESS TO THE KEY MESSAGES FOR THE MANAGERS

**GIVE US YOUR FEEDBACK!**  
DO YOU WANT TO SEND US A REVIEW?  
SEND

## ROAD SAFETY MANUAL

A MANUAL FOR PRACTITIONERS AND DECISION MAKERS  
ON IMPLEMENTING SAFE SYSTEM INFRASTRUCTURE!

INTRODUCTION

STRATEGIC GLOBAL  
PERSPECTIVE

ROAD SAFETY  
MANAGEMENT

PLANNING, DESIGN &  
OPERATION

TOOLS



# PART 1

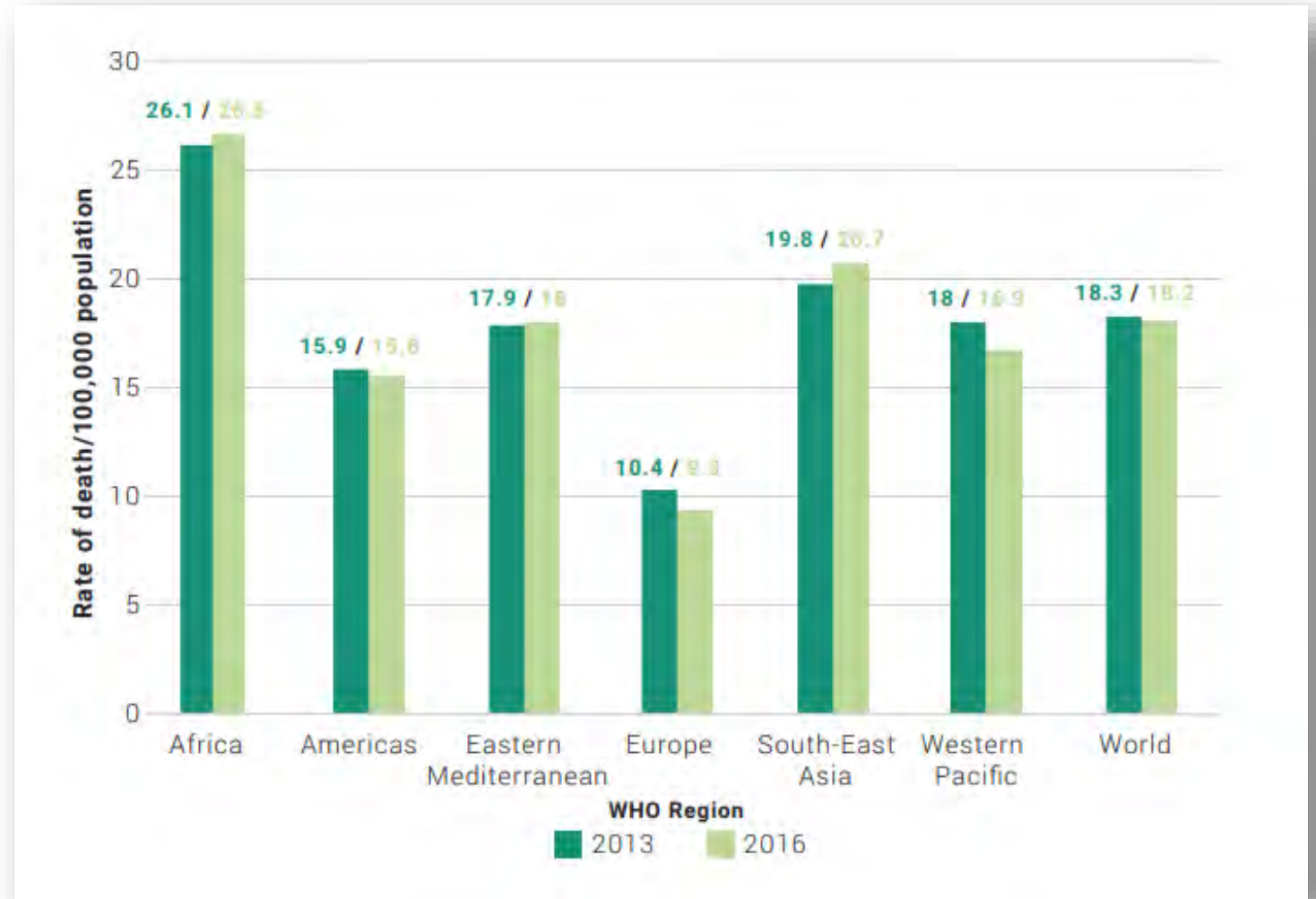
## Strategic global perspective

Chapter 1: Scope of the road safety problem

Chapter 2: Key developments in road safety

# The Scope of the Road Safety Problem

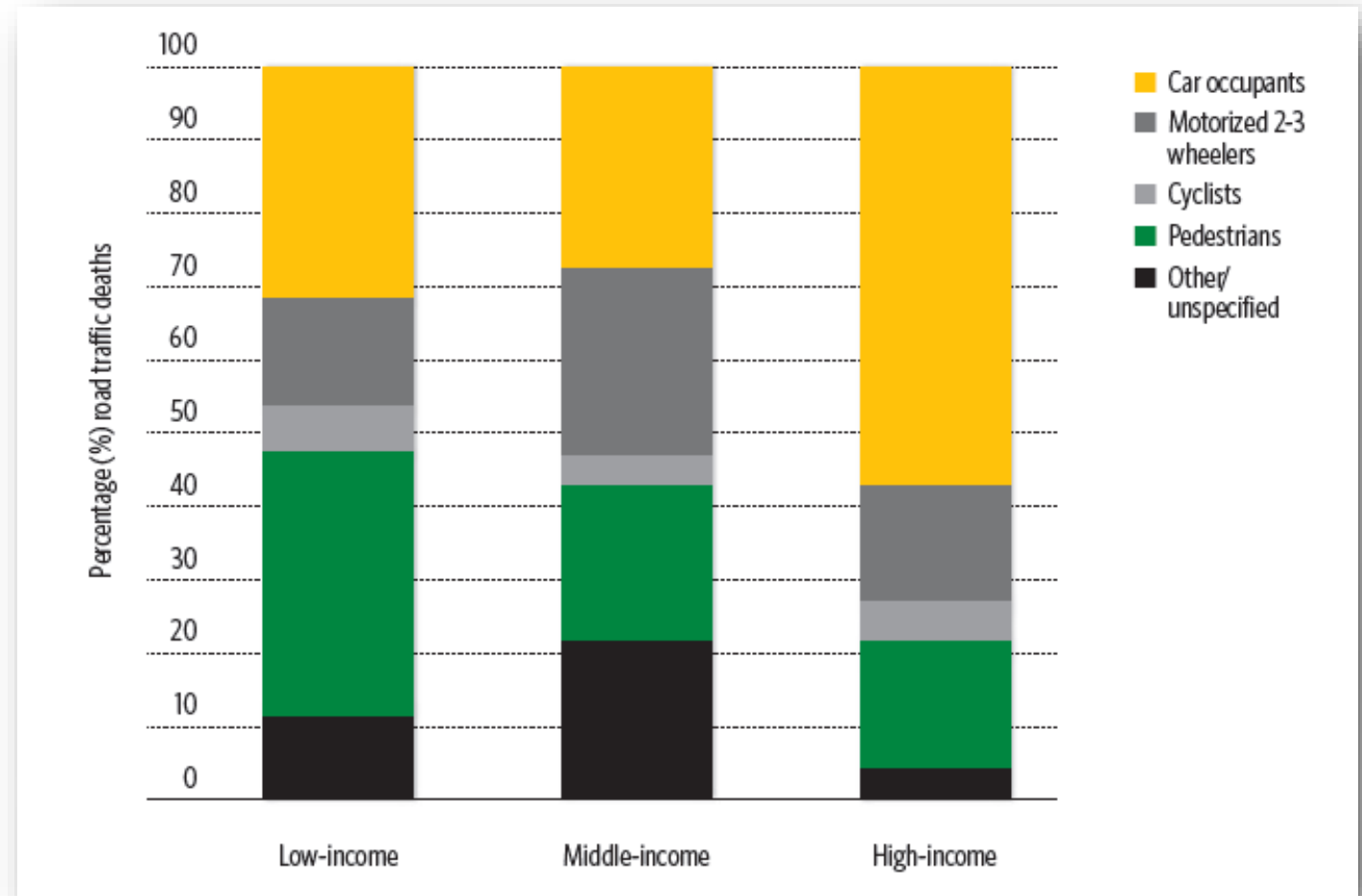
- The RSM recognizes that deaths and injuries related to road crashes is too high
- Low and middle income countries are most vulnerable
- Equivalent to 1-7% of the gross domestic
- Deaths and injuries are preventable





# The Scope of the Road Safety Problem

- UN Decade of Action goal to stabilize deaths by 2020
- Shift to the Safe Systems approach
- Political interest is needed to set long term goals, target and provide resources
- High income countries need to continue to pursue evidenced based approaches



Source: WHO 2013



## ROAD SAFETY MANUAL

A MANUAL FOR PRACTITIONERS AND DECISION MAKERS  
ON IMPLEMENTING SAFE SYSTEM INFRASTRUCTURE!

INTRODUCTION

STRATEGIC GLOBAL  
PERSPECTIVE

ROAD SAFETY  
MANAGEMENT

PLANNING, DESIGN &  
OPERATION

TOOLS



## PART 2

# Road safety management

Chapter 3: The Road Safety Management System

Chapter 4: The Safe System Approach

Chapter 5: Effective management and use of safety data

Chapter 6: Road safety targets, investment strategies, plans and projects

# Safe systems

- ITF (2016) suggest that the key Safe System Principles are that:
- People make mistakes that can lead to road crashes
- The human body has a limited physical ability to tolerate crash forces before harm occurs
- 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
- All parts of the system must be strengthened to multiply their effects; and if one part fails, road users are still protected.



## ROAD SAFETY MANUAL

A MANUAL FOR PRACTITIONERS AND DECISION MAKERS  
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PERSPECTIVE

ROAD SAFETY  
MANAGEMENT

PLANNING, DESIGN &  
OPERATION

TOOLS

# PART 3

## Planning, Design and Operation

- Chapter 7: Roles, responsibilities, policy development, and programmes
- Chapter 8: Design for road user characteristics and compliance
- Chapter 9: Infrastructure Safety Management: Policies, standards, guidelines and tools
- Chapter 10: Assessing potential risks and identifying issues
- Chapter 11: Intervention selection and prioritization
- Chapter 12: Monitoring and evaluation of road safety interventions

# Human factors

- Unless roads are designed and managed to take account of human factors, it is unlikely that a Safe System can be achieved.
- Speed management is key.
- Speeds are the result of road design and the resulting subconscious choices made by road users.
- Management of the field of view and the pre-programming of drivers expectations.
- A skillful combination of design elements can create 'self-explaining' roads where appropriate actions.





# Infrastructure

- Improvements to infrastructure can contribute substantially to reductions in death and serious injury.
- Road infrastructure is often the single most significant factor that contributes to the severity outcome of a crash.
- Clear and defined policies relating to the delivery of Safe System infrastructure are required to drive road safety improvements.
- Standards, guidelines and tools are a mechanism to translate policy into action.
- For those just starting to address safety, corridor demonstration projects are a very effective way to improve safety.



Source: [www.towardszero.vic.gov.au](http://www.towardszero.vic.gov.au)

# Selection and Prioritization

- Intervention
  - Appropriate interventions must be assessed and selected to address risk.
  - Interventions are available to address the contributing factors to crashes
  - Detailed information is available on interventions and use, including for those in LMICs.
  - Economic assessment occurs to identify the most cost-effective use of resources. The process for this is well established, including for LMICs, and tools are available to assist in this task.
- LMIC=Low and medium income countries



# Monitoring, Analysis and Evaluation

- Monitoring, analysis and evaluation are essential.
- **Monitoring** refers to the systematic collection of data regarding the performance of a road safety program or intervention during or after its implementation.
- **Analysis** involves the study of data in order to interpret it and its parts, such as determining the contributing factors to crashes.
- **Evaluation** involves the analysis of this data to determine the effect of the treatment or program, or to compare locations.
- There is also a need to **monitor, analyze and evaluate** the effectiveness of infrastructure interventions and progress on targets. There are knowledge gaps regarding the effectiveness of interventions, especially in LMICs.
- Techniques and tools are available to help in this important task.

# Case Studies

INTRODUCTION

STRATEGIC GLOBAL  
PERSPECTIVE

ROAD SAFETY  
MANAGEMENT

PLANNING, DESIGN &  
OPERATION

TOOLS



## ROAD SAFETY MANAGEMENT

SAFETY MANAGEMENT SYSTEM

THE SAFE SYSTEM APPROACH

SAFETY DATA

TARGET AND STRATEGIC PLANS

INTRODUCTION

TIMEFRAMES

CAPACITY TO DELIVER TARGETS

ASSESSING SAFETY PROBLEMS

» SETTING TARGET

## CASE STUDIES – TARGET-SETTING

Contained below are a number of case studies on target setting:

### CASE STUDY - Denmark: Road Safety Commission National Action Plan

The need to reduce fatal and injury crashes in Denmark, has led to the development of a national action plan. Every Accident is one too many - a shared responsibility is the official name for the Danish Road Safety Commission National Action Plan 2013-2020. The number of road users killed or injured on Danish roads has halved since 2001. A very important player is the Danish Road Safety commission who sets ambitious road safety targets on a regular basis. The targets are then used and adopted by relevant stakeholders involved making an effort and taking responsibility for implementing the objectives to reach the target in the Action Plan. The stakeholders need to be supported by political commitment and get necessary earmarked funding for road safety to reach the target. [Read More](#) (PDF, 206 kb)

70+ case studies from across the world

# Thank you for your attention!



**John C Milton**

Introduction to the Road Safety Manual

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