WORLD ROAD ASSOCIATION

Road Safety:
A priority for society and for PIARC

CEDR & DIRCAIBEA Joint workshop, 4 October 2017
What is PIARC
Addressing members’ expectations

• Non-political, non-profit association established in 1909
• Aim: promote international cooperation on issues related to roads and road transport
• Consultative Status on the Economical and Social Council of United Nations
• With its broad membership and geographic diversity, the vision of the World Road Association is to become:

“The world leader in the exchange of knowledge on roads and road transport policy and practices within the context of integrated, sustainable transport.”

• Recognised for the quality of our outputs
Executive Committee
2017-2020

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National Committees’ Representative
Saverio Palchetti (Italy)
PIARC’s Four key missions

• Be a leading international forum for analysis and discussion of the full spectrum of transport issues related to roads and related transport;

• Identify, develop, and disseminate best practice and give better access to international information;

• Consider within its activities the needs of developing countries and countries in transition fully; and

• Design, produce, and promote efficient tools for decision making on matters related to roads and related transport.

• The Association mobilizes the expertise of its members

• Through operations guided by a 4-year Strategic Plan
Extensive membership base

- 121 National governments are members of the Association
- Members from a total of 140 countries
  - Regional authorities
  - Public and private members: industry, research etc.
  - Individual members
- Partners with regional organizations
  - CEDR and DIRCAIBEA among others
- More than 1 000 experts are currently mobilised in our working groups
Knowledge exchange: The core of PIARC

- PIARC mobilises international road and transport experts through more than 20 groups:
  - Ad-hoc dialogue among peers
  - Network building
  - Joint work towards commonly-agreed deliverables

- These deliverables are widely accessible:
  - Reports
  - Seminars or workshops
  - Online manuals
  - Software and tools

- PIARC Congresses are world-class focus points for:
  - Dissemination of these deliverables
  - Further discussions
Good roads contribute to sustainable development

Sustainable economic growth
Build resilient infrastructure
Make cities resilient
Combat Climate Change
Build effective institutions
Access to education
Access to Health

"By 2020, halve the number of global deaths and injuries from road traffic accidents"
Technical committee reports
- 43 reports in 2012 – 2015
- Available free of charge

International seminars and workshops
- 26 seminars and 7 workshops in 2012-2015

The Winter Road and World Road Congresses
- Andorra 2014, Gdansk 2018
- Seoul 2015, Abu Dhabi 2019

Routes/Roads magazine
- Trilingual quarterly
PIARC outputs (2/2)

- Online Road Dictionary
- Online manuals:
  - Road safety web-manual
  - RNO and ITS web-handbook
  - Road Tunnels web-manual
  - NEW: Asset Management Manual
- Snow and Ice Databook
- Software
  - HDM-4
  - DG-QRAM
PIARC Online Road Safety Manual:
A comprehensive resource

- http://roadsafety.piarc.org/en

- Designed to help countries at every stage of infrastructure development fulfil road safety objectives
- It includes new thinking on road safety and offers a clear argument on why adopting a Safe System approach is crucial for your country
- A comprehensive, state-of-the-art international reference document and a “living” tool that can assist all countries in fulfilling key objectives

- The Road Safety Manual has been acknowledged in United Nations' resolution A/70/L.44 on road safety
PIARC Online Road Safety Manual: Free of charge

- http://roadsafety.piarc.org/en

- Free of charge

- Languages:
  - Available in English
  - Translated by the World Bank
  - Spanish version available end 2017; many partners from DIRCAIBEA contributed to the review
  - French version to follow

- Key principles for each of the topics are included and discussed in the sections - 3 Main Parts, 12 chapters
- Case studies and links to detailed technical material and other references
- Can be downloaded and printed in chapters

Échanger connaissances et techniques sur les routes et le transport routier / Exchange knowledge and techniques on roads and road transportation
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 first 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.
Online Road Safety Manual
3 Main Parts, 12 chapters

• **Part I on Strategic Global Perspective** introduces the range of problems facing road safety professionals around the world and looks at the strategic issues involved in developing a management system.

• **Part II on Road Safety Management** presents strategies for delivering targeted improvements and guidance on how to plan, design, prioritize, implement, and manage these interventions within a country’s road network.

• **Part III on Planning, Design and Operation** demonstrates the safety impacts and value created by adopting the global strategies.
Online Road Safety Manual
Parts I & II

- **Part I on Strategic Global Perspective** introduces the range of problems facing road safety professionals around the world and looks at the strategic issues involved in developing a management system.
  - Chapter 1: Scope of the road safety problem
  - Chapter 2: Key developments in road safety

- **Part II on Road Safety Management** presents strategies for delivering targeted improvements and guidance on how to plan, design, prioritize, implement, and manage these interventions within a country’s road network.
  - Chapter 3: The road safety management system
  - Chapter 4: The safety system approach
  - Chapter 5: Effectiveness and use of safety data
  - Chapter 6: Road safety targets, policies, and plans
Online Road Safety Manual
Parts III

- Part III on Planning, Design and Operation demonstrates the safety impacts and value created by adopting the global strategies.
  - Chapter 7: Roles, responsibilities, and management capacity
  - Chapter 8: Design for road users, characteristics and compliance
  - Chapter 9: Infrastructure safety management: policies and tools
  - Chapter 10: Assessing potential risks and identifying issues
  - Chapter 11: Intervention selection and prioritization
  - Chapter 12: Monitoring and evaluation of effectiveness of actions
PIARC Online Safety Manual
Global Steering Committee

UNECE

THE WORLD BANK

ASIAN DEVELOPMENT BANK

International Transport Forum

World Health Organization

European Investment Bank

AFRICAN DEVELOPMENT BANK GROUP

Échanger connaissances et techniques sur les routes et le transport routier / Exchange knowledge and techniques on roads and road transportation
Strategic Theme Safety
12 recent Technical Reports (2012-2015)

- The Role of Road Engineering in Combatting Driver Distraction and Fatigue Road Safety Risks
- Human factors guidelines for a safer man-road interface
- Fixed fire fighting systems in road tunnels: Current practices and recommendations
- Improving safety in road tunnels through real-time communication with users
- Human factors in road design. Review of design standards in nine countries
- Road accident investigation guidelines for road engineers
- Comparison of national road safety policies and plans
- Road safety inspection guidelines for safety checks of existing roads
- Best practices for road safety campaigns
- Improvements in safe working on roads
- State of the practice for cost-effectiveness analysis, cost-benefit analysis and resource allocation
- Best practice for road tunnel emergency exercises
<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>The Role of Road Engineering in Combatting Driver Distraction and Fatigue Road Safety Risks</th>
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<tbody>
<tr>
<td><strong>Date:</strong></td>
<td>2016</td>
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<tr>
<td><strong>Number of pages:</strong></td>
<td>73</td>
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</table>

**Purpose of the report:**
Driver distraction and fatigue are a problem because, as remarkable as our abilities are, we humans are fallible and our abilities have limitations. Driver distraction and fatigue incorporates elements of both limitations and fallibility. On top of our limitations and fallibilities, driving a vehicle is a surprisingly complex task that involves numerous elements.

**Recommendations:**
The review of the extensive literature related to driver distraction and fatigue, found an overwhelming focus on driver education and enforcement strategies seeking to encourage drivers to avoid being distracted or fatigued while driving. This might explain why it was also found that many jurisdictions have sought to combat driver distraction and fatigue by raising awareness of the risk, establishing rules (such as to prohibit texting) and imposing significant penalties to discourage non-compliance. However, it was also found that driver distraction and fatigue are distinct and each comprise a number of separate elements that can be detrimental to road safety in different ways.
Human factors guidelines for a safer man-road interface

Date: 2016

Number of pages: 78

Purpose of the report:
In the case of road safety, the Human Factors concept considers road characteristics that influence a driver's right or wrong driving actions. It understands the causes of road users' operational mistakes as the first step in a chain of actions which may proceed to an accident. Many often observed operational mistakes result from a direct, subconscious interaction between road characteristics and road users' threshold limit values of perception, information processing and action. Because the driver's reaction characteristics can not be changed, attention should be focused on a self-explaining road design.

Recommendations:
This guideline explains the relationship between several road characteristics that trigger wrong perception and therefore also wrong driving reactions, most of which happen subconsciously. Detailed examples and sketches allow the engineer to understand the relationship between misleading and irritating road characteristics and operational mistakes. They can be used as a kind of checklist in "on-the-spot" investigation of black spots or single vehicle accidents or in road safety inspections (RSI). They can also be used to qualify planning and design processes in road safety audits (RSA).
## Title

**Fixed fire fighting systems in road tunnels: Current practices and recommendations**

**Date:** 2016

**Number of pages:** 80

### Purpose of the report:
Fixed Fire Fighting Systems (FFFS) have been routinely used in road tunnels in countries such as Japan and Australia for decades, and there is increased interest in the use of FFFS in parts of Europe, North America and Asia.

### Recommendations:
Within this report, the functional impact FFFS can make to the performance of tunnel fire safety systems is discussed. Information is presented about the types of systems available, their use in road tunnels for various countries, and advice provided on the design and selection of appropriate FFFS. Where FFFS are adopted, it is essential that they are correctly designed, installed, integrated, commissioned, maintained, tested and operated. Where FFFS are installed, it is recommended that they are activated in the early stages of a fire to minimise fire growth and to provide the desired effectiveness.
<table>
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<th>Title</th>
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<tr>
<td>Improving safety in road tunnels through real-time communication with users</td>
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<tr>
<td>Date: 2016</td>
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<td>Number of pages: 60</td>
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**Purpose of the report:**
This report is a continuation of the one published by PIARC in 2008 on "Human Factors and road tunnel safety regarding users". It addresses two specific points raised in the conclusion of the 2008 report:
"It is most important that motorists understand how to behave in tunnels, in critical situation" "In case of fire, tunnel users should be alerted by at least two different channels of communication".

**Recommendations:**
This report describes human behavioural aspects when driving, and how to communicate information to tunnel users in normal, congested and critical situations. It then details the various systems that can be activated for real-time communication with users. It reviews how these devices can be used in cases of congestion, a serious incident and fire and how the activation of these systems and devices must be adapted to the changing circumstances of the event.
<table>
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<tr>
<td>Human factors in road design. Review of design standards in nine countries</td>
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<tr>
<td>Date: 2012</td>
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<td>Number of pages: 212</td>
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**Purpose of the report:**
This report reviews how human factors are explicitly or implicitly considered in the current road design standards of the following countries: Australia, Canada, China, Czech Republic, France, Hungary, Japan, the Netherlands, and Portugal. The report focuses on design features as they relate to the spatial perception of the driver. It covers in particular:

- the need for the driver to anticipate any critical point;
- management of the field of view to ensure appropriate speed and lane tracking;
- the human factors demands to pre-program the driver's behaviour.

**Recommendations:**
For the different criteria and factors, the report identifies best practices and provides recommendations for the missing links such as:
- the optical density of the field of view;
- transition zones;
- fixation objects in the lateral road side environment;
- depth of the field of view.
**Title**

Road accident investigation guidelines for road engineers

**Date:** 2013

**Number of pages:** 51

**Purpose of the report:**
In order to improve road safety, availability of accident data and an understanding of the circumstances that lead to crashes are of vital importance. The purpose of Road Accident Investigation (RAI) is to help road engineers detect road infrastructure deficiencies that influence an accident, in order to guide them in drafting a preference list of improvement interventions or of black spot treatments, and in designing appropriate improvement measures.

**Recommendations:**
The report describes the accident data needed, how the location of crashes should be reported, and how accident data should be assessed. Focus is placed on collision diagram and on their analysis. A number of examples are presented in the appendices to illustrate the different situations.
### Title

**Comparison of national road safety policies and plans**

**Date:** 2012

**Number of pages:** 304

**Purpose of the report:**
This Report examines the road safety performance of several nations, reviews reported policies and strategies in jurisdictions and attempts to establish linkages between adopted and implemented road safety policies, overarching multi-year strategies and performance outcomes. The findings are built upon survey returns from 16 countries and 8 selected state/provincial jurisdictions which set out the road safety visions, strategies, policies and practices they have adopted to improve road safety.

**Recommendations:**
The surveys sought information which included: road safety vision, ambition and approach, road safety management arrangements, policies adopted to address drink driving, drug driving, speeding, and improve seat belt and helmet use, penalties to deter non-compliance with these policies, improvement of the inherent road safety through policies for infrastructure safety programs and speed limit setting guidelines, policies to achieve improved standards of vehicle safety, policies linking injury insurance premiums and crash risk by vehicle or user, etc.
<table>
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<tr>
<td>Road safety inspection guidelines for safety checks of existing roads</td>
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</table>

**Date:** 2012

**Number of pages:** 83

**Purpose of the report:**
A Road Safety Inspection (RSI) is a systematic, on site review, conducted by road safety expert(s), of an existing road or section of road to identify hazardous conditions, faults and deficiencies that may lead to serious accidents.

After defining what is a road safety inspection, the report details what should be inspected, depending on the type of road and when should inspections be carried out. It provides a description of the inspection process: preparatory work in the office, field study, check lists, content of the inspection report and the remedial measures and follow up to be considered.

**Recommendations:**
The report addresses also the matter of who should carry out an inspection.
The report is complemented by appendices which contain:
- check lists for different types of roads (motorways, interurban roads, urban main roads);
- a proposed investigation form;
- examples of road safety inspection reports.
## Title

### Best practices for road safety campaigns

### Date: 2012

### Number of pages: 50

### Purpose of the report:
The report presents key findings of a literature review of best practices for road safety campaigns, and relate these to actual road safety campaign practices by road administrations and authorities of fourteen countries who responded to a survey questionnaire.

### Recommendations:
The report covers the following key focus areas:
1. Road User Behaviour (including reference to theories of behaviour change),
2. Types of Road Safety Campaigns,
3. Target Audiences,
4. Campaign Media, and
5. Campaign Evaluation.

It shows how and why these issues should be sufficiently researched and understood before implemented by road authorities and administrations.
**Title**

Improvements in safe working on roads

**Date:** 2012

**Number of pages:** 99

**Purpose of the report:**
The focus of this guide is on safety of both workers and road users in construction zones. For the safe, efficient and effective management of work zones, it is proposed that a 4 C’s principle be adopted. Work zones should be designed, operated and maintained such that the works are conspicuous, clear, consistent and credible.

**Recommendations:**
The report addresses in its different chapters:
- The roles and responsibilities in the work zones;
- Planning and design of work zones;
- Safe and efficient operations of work zones;
- Personnel guidance in work zones;
- Typical work zones layout;
- Checklists for work zones safety.
# State of the practice for cost-effectiveness analysis, cost-benefit analysis and resource allocation

**Date:** 2012  
**Number of pages:** 102

### Purpose of the report:
This report examines the economic analysis techniques applicable to investments to improve road safety, in order to optimize the allocation of available resources. It presents the basics of project evaluation before detailing the methods of cost-effectiveness and cost-benefit analysis.

### Recommendations:
The report also discusses the valuation of the cost of road accident casualties and discusses the valuation according to the income level for different countries. It then presents the data needed to assess the impact of measures taken for road safety. The report also includes a literature review of recent studies on the evaluation of the effectiveness of measures. A review of barriers to the use of assessment tools and practices in various countries conclude the report. Appendices contain the answers to an international survey and case studies of cost-effectiveness analysis and cost-benefit analysis performed in the Netherlands.
<table>
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<tr>
<td><strong>Best practice for road tunnel emergency exercises</strong></td>
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<td><strong>Date:</strong> 2012</td>
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<td><strong>Number of pages:</strong> 50</td>
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</table>

**Purpose of the report:**
Emergency exercises are an integral part of the planning process of road tunnel safety. Drawing on international experience in this area, this report is in the form of a detailed guide for defining objectives, prepare, implement and evaluate an exercise in the most efficient and productive as possible. It also contains practical information on the resources and personnel required for the organization of an emergency exercise, on the costs and outcomes.

**Recommendations:**
For non-yet experienced emergency exercise planning officers, this report can help to clearly define the objectives to achieve, set the steps to take before moving to practice, and to choose the size and the type of exercise to perform. The report is also useful as a checklist for exercise planning officers.
Strategic Plan for 2016-2019
Two Committees on Road Safety

• 5 Strategic Themes
  ➢ A. Management and Finance
  ➢ B. Access and Mobility
  ➢ C. Safety
  ➢ D. Infrastructure
  ➢ E. Climate Change, Environment and Disasters

• 18 Technical Committees and 4 Task Forces
  ➢ Including the Terminology Committee
<table>
<thead>
<tr>
<th>A. Management and finance</th>
<th>B. Access and mobility</th>
<th>C. Safety</th>
<th>D. Infrastructure</th>
<th>E. CC-Environment - Disasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1 Performance of transport administrations</td>
<td>B.1 Road Network Operations / ITS</td>
<td>C.1 National road safety policies and programs</td>
<td>D.1 Asset management</td>
<td>E.1 Adaptation strategies / Resilience</td>
</tr>
<tr>
<td>A.2 Road transport system economics and social development</td>
<td>B.2 Winter services</td>
<td>C.2 Design and operations of safer road infrastructure</td>
<td>D.2 Pavements</td>
<td>E.2 Environment considerations in road projects and operations</td>
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<tr>
<td>A.3 Risk management</td>
<td>B.3 Sustainable multimodality in urban areas</td>
<td>C.3 Infrastructure security</td>
<td>D.3 Bridges</td>
<td>E.3 Disaster management</td>
</tr>
<tr>
<td>B.4 Freight</td>
<td>C.1 Infrastructure security</td>
<td>D.4 Rural roads and earthworks</td>
<td>D.5 Road tunnels operations</td>
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<tr>
<td>A.1 Innovative financing</td>
<td>B.1 Road design &amp; infrastructure for innovative solutions</td>
<td>C.1 Infrastructure security</td>
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<tr>
<td>A.2 Coordinating National and Subnational adm.</td>
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Truly International Leadership

• Committee C.1
  • Chair: Roberto Arditi (Italy)
  • French Sp. Sec.: Laurent Carnis (France)
  • English Sp. Sec.: Rob Mc Inerney (Australia)
  • Spanish Sp. Sec.: Juan Emilio Rodriguez Perrotat (Arg.)

• Committee C.2
  • Chair: Shaw Voon Wong (Malaysia)
  • French Sp. Sec.: Matthieu Holland (France)
  • English Sp. Sec.: Lucy Wickham (UK)
  • Spanish Sp. Sec.: Alberto Mendoza Diaz (Mexico)

• Theme coordinator: Jean-François Corté (France)
Strategic Plan for 2016-2019
Six Forthcoming reports

- National Road Safety policies evolution
- Road Safety Audit guidelines
- Vulnerable road users
- Human factors in road design and operations including driver distraction and fatigue.
- Setting credible speed limits
- Catalogue of design, operations and maintenance safety problems and potential countermeasures for LMIC
<table>
<thead>
<tr>
<th>TC</th>
<th>2nd half 2016</th>
<th>1st half 2017</th>
<th>2nd half 2017</th>
<th>1st half 2018</th>
<th>2nd half 2018</th>
<th>1st half 2019</th>
<th>October 2019 (with World Road Congress)</th>
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<tr>
<td>C.1</td>
<td>Rome, Italy</td>
<td>Marrakech Morocco (with Workshop)</td>
<td>Teheran Iran (25-27 Nov) (with Seminar)</td>
<td>South Africa</td>
<td>China (with Seminar)</td>
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<td>Abu Dhabi</td>
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<tr>
<td>C.2</td>
<td>Florence, Italy</td>
<td>Santiago, Chile</td>
<td>Rome, Italy (6-8 Dec)</td>
<td>Ottawa, Canada (April)</td>
<td>China (with Seminar)</td>
<td>Malaysia (with Seminar)</td>
<td>Abu Dhabi</td>
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**PIARC Strategic Theme C Safety**

Meetings and seminars 2016 - 2019
Further developments

- John Milton (USA) is editor-in-chief of PIARC’s RSM
- Existing reports are being integrated into RSM:
  - “Comparison of national road safety policies and plans”
  - “Taking advantage of intelligent transport systems to improve road safety”. Etc.
- Many more case studies are being collected
- Training and implementation strategy:
  - Preparation of a webinar with USA’s TRB
  - PIARC Session at TRB annual meeting in January 2018
- Forthcoming issue of Routes/Roads on road safety
  - With strong Latin America component
Conclusions

- Road Safety is a key topic for PIARC
- Innovative online Road Safety Manual
- Several outputs are available: 12 reports from our 2012-2015 cycle
- More are being developed: 6 new reports, 4 seminars
- All accessible free of charge

- Input from all is welcome
  - Contact: kirsten.graf-landmann@piarc.org
PIARC CONGRESSES

• Save the dates!

• 15th International Winter Road Congress
  • Gdansk, Poland
  • 20 – 23 February 2018

• 26th World Road Congress
  • Abu Dhabi, United Arab Emirates
  • 6 – 10 October 2019
Thank you for your attention

www.piarc.org
info@piarc.org

Patrick Malléjacq
PIARC Secretary General
patrick.mallejacq@piarc.org