



**XXIV<sup>th</sup> WORLD  
ROAD CONGRESS**  
Mexico City 2011

## OVERVIEW OF ACTIVITIES IN 2008-2011

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# TERMS OF REFERENCE

- C.4.1 : Improve tunnel operation and maintenance
- C.4.2 : Manage and improve tunnel safety
- C.4.3 : Influence users' behaviour in tunnels
- C.4.4 : Optimise tunnel ventilation and mitigate fires
- C.4.5 : Evaluate, organise and communicate knowledge on tunnel operation and safety



# MEMBERSHIP

- 51 Members from 32 countries
  - 19 Corresponding Members from 19 countries
  - 7 Associate Members from 5 countries
  - 63 Working Group Associate Members from 17 countries
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- Total of 140 experts from 38 countries



# C4 MEETINGS



## SEMINARS

- 3 workshops dealing with tunnel safety, operations and refurbishment in Montreal (Canada), Auckland (New Zealand) and St Petersburg (Russia)
- 1 seminar in Buenos Aires (Argentina) on Tunnels and ITS Applications
- 1 seminar in Xiamen (China) on Construction and Management of Underwater Tunnels
- 1 special technical session on Road Tunnel Winter Maintenance and Operation, during the PIARC Winter Road Congress in Québec (Canada)



## OTHER EVENTS

- Lyon (France) : presentation of PIARC and C4 during the opening session of the "1st European Forum of Road Safety Officers" in 11/2009
- Bilbao (Spain) : presentation of PIARC, C4 and the Road Tunnel Manual during the ATC Conference in 02/2010
- Portorož (Slovenia) : presentation of PIARC, C4 and the Manual during the X Slovenian Congress on Roads and Transport in 10/2010
- Other C4 presentations in Chile, UK, ...



# WORKING GROUPS

- C.4.1 → WG1 Road tunnel operations
  - 19 C4 + 14 WG members, 8 meetings
- C.4.2 → WG2 Manage and improve road tunnel safety
  - 28 C4 + 12 WG members, 6 meetings
- C.4.3 → WG3 Influence users' behaviour in tunnels
  - 2 C4 + 16 WG members, 8 meetings
- C.4.4 → WG4 Air quality fire & ventilation
  - 14 C4 + 27 WG members, 7 meetings
- C.4.5 → WG5 Knowledge management
  - 14 C4 + 1 WG members, 8 meetings



# WG1 ROAD TUNNEL OPERATIONS

- Strategic tunnel safety management
- Good practice for road tunnel emergency exercises
  - Step by step guide to define the objectives, to prepare, carry out and evaluate an exercise
- Management of maintenance and technical inspections of road tunnels
- Life cycle aspects of electrical road tunnel equipment
  - Lessons on reliability, availability and maintainability





## WG2 MANAGE AND IMPROVE ROAD TUNNEL SAFETY

- Current practice for risk evaluation in road tunnels
  - Guidance on how to evaluate the results of risk analyses, with examples of different approaches taken worldwide
- Improving Safety in Existing Tunnels
  - Step by step guide to identifying priorities and methods for improving safety in existing tunnels, including infrastructure, prevention and operation



## WG3 INFLUENCE USERS' BEHAVIOUR IN TUNNELS

- Drivers' education
  - Background guide to human factors and driver behaviour in tunnels, what has to be communicated to tunnel users and what the driver must do
- *Real-time communication with tunnel users*
  - *Preparatory work performed in this cycle, but report postponed to next cycle*



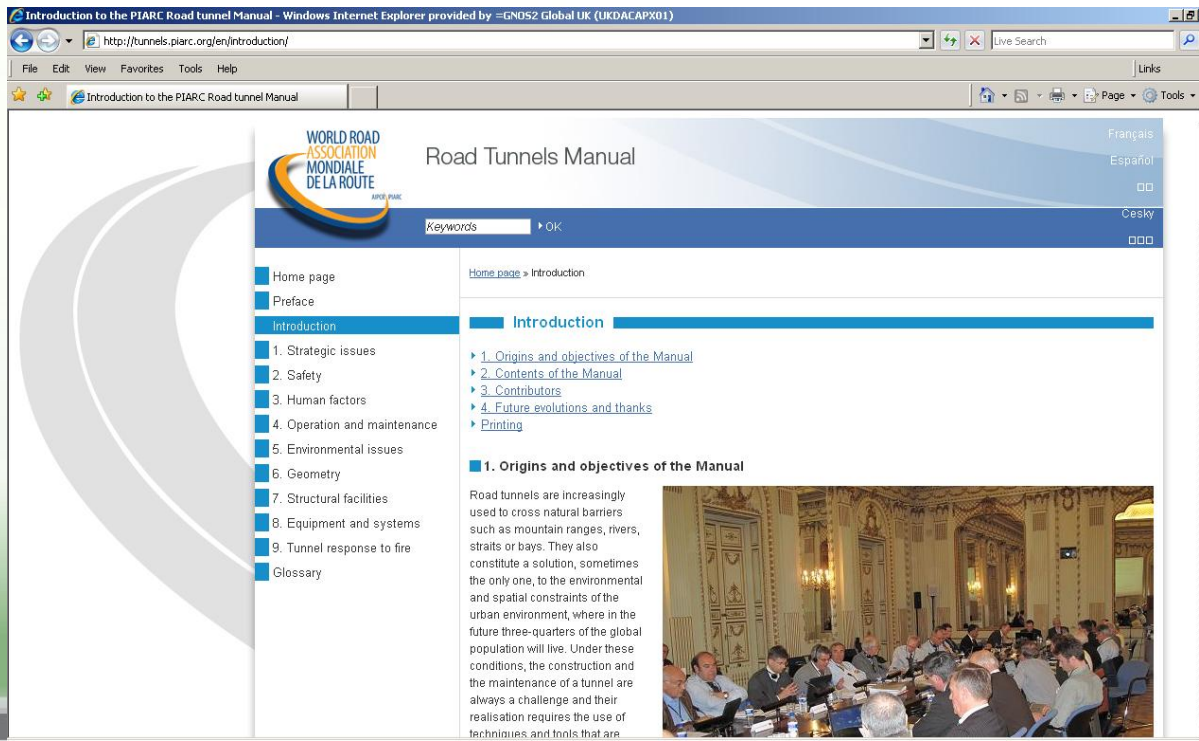
## WG4 AIR QUALITY FIRE & VENTILATION

- Vehicle emissions and air demand for ventilation
  - Updated guidance on ventilation demands in response to new reductions of pollutant emissions and consideration of new pollutants
- Design Fire Characteristics for Road Tunnels
  - Fire test data and guidance on defining design fires for road tunnels
- *Guidelines on the applicability, cost effectiveness and operation of fixed fire fighting systems*
  - *Work started, but postponed to next cycle*



# WG5 KNOWLEDGE MANAGEMENT

- Road Tunnels Manual
  - An online compendium (on PIARC's web site) of all of PIARC's guidance on road tunnel operations



The screenshot shows a web browser window displaying the 'Introduction to the PIARC Road tunnel Manual' page. The browser's address bar shows the URL 'http://tunnels.piarc.org/en/introduction/'. The page features the PIARC logo (World Road Association / Association Mondiale de la Route) and the title 'Road Tunnels Manual'. A search bar with the text 'Keywords' and an 'OK' button is visible. A navigation menu on the left lists sections: Home page, Preface, Introduction, 1. Strategic issues, 2. Safety, 3. Human factors, 4. Operation and maintenance, 5. Environmental issues, 6. Geometry, 7. Structural facilities, 8. Equipment and systems, 9. Tunnel response to fire, and Glossary. The main content area is titled 'Introduction' and contains a list of links: 1. [Origins and objectives of the Manual](#), 2. [Contents of the Manual](#), 3. [Contributors](#), 4. [Future evolutions and thanks](#), and [Printing](#). Below this, the first section is titled '1. Origins and objectives of the Manual' and includes a paragraph of text and a photograph of a group of people in a meeting room.

