



THE PIARC TECHNICAL COMMITTEE « C4 : ROAD TUNNEL OPERATIONS »

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C4 Committee president

Permanent International Association of Road Congresses

In French :

*Association Internationale
Permanente
des Congrès de la Route*

i 100 years 2009 !

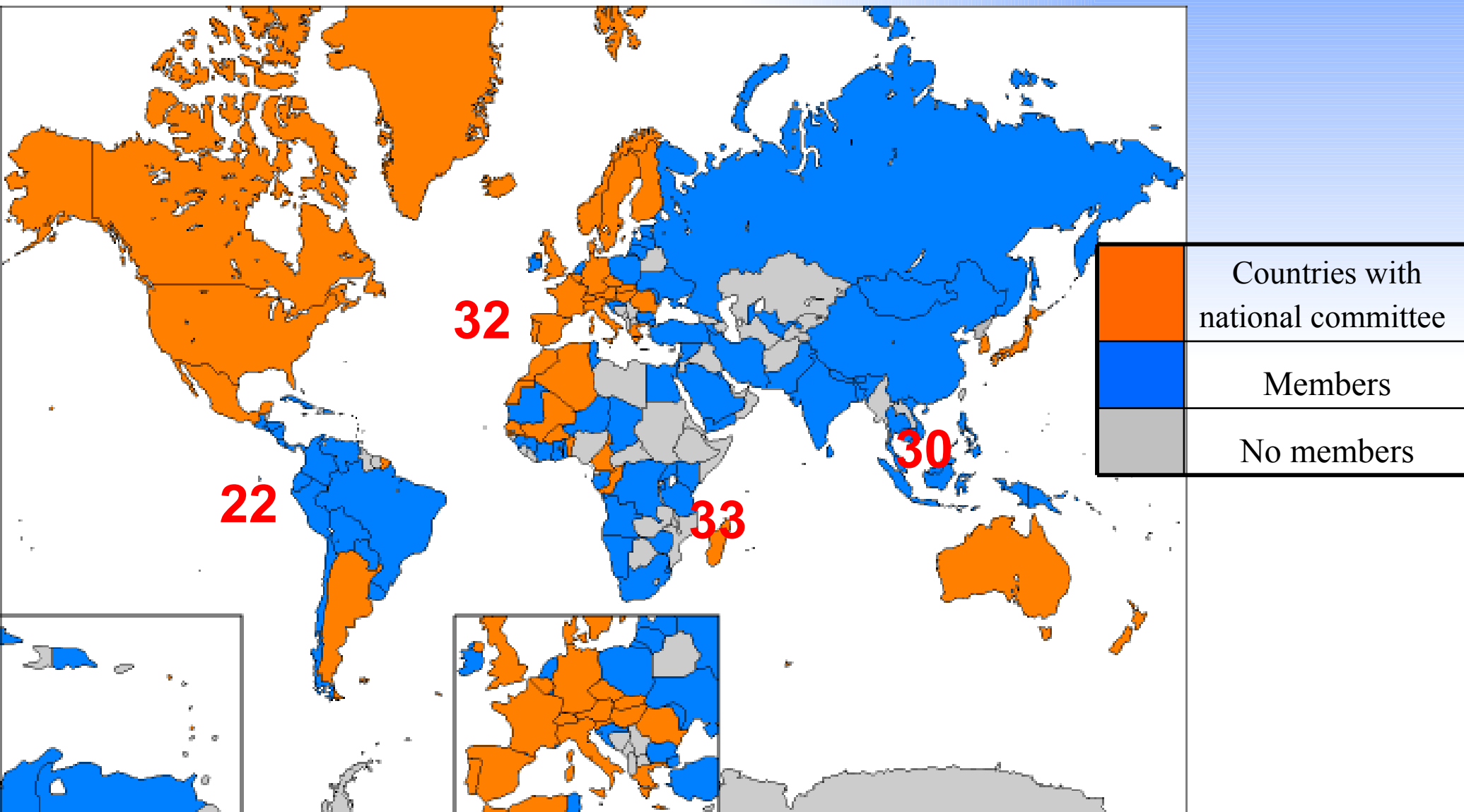
Association
mondiale
de la Route



World Road
Association



PIARC's 117 Countries Members



The Technical Committees for the 2008-2011 cycle :

20 technical committees in 4 strategic themes

- **Strategic Theme A - Sustainability of the Road Transport System**
- **Strategic Theme B - Improving the furniture of services**
- **Strategic Theme C - Safety of the Road System**
 - C.1 : Safer Road Infrastructure
 - C.2 : Safer Road Operations
 - C.3 : Managing Operational Risk in National and International Road Operations
 - C.4 : Road Tunnel Operations**
- **Strategic Theme D - Quality of Road Infrastructures**
- **Committee on Terminology and Translation Assistance**

The C4 Technical Committee "Road Tunnel Operations"

- 49 Members designated by the PIARC First delegate of their countries (coming from 31 countries)**
 - 18 Corresponding Members designated by the PIARC First delegate of their countries (coming from 18 countries)**
 - 6 Associate Members designated by PIARC general secretariat and the C4 committee**
 - 62 WGs Associate Members designated by the C4 committee**
- TOTAL : 135 experts coming from 38 countries**

C.4.2 - Manage and improve tunnel safety

| <i>Strategies</i> | <i>Outputs</i> |
|---|---|
| <p>Identify priorities and methods for improving safety in existing tunnels, including infrastructure, prevention and operation.</p> <p>Develop recommendations for risk analysis and investigate strategies for risk evaluation.</p> | <p>Report summarising the priority areas on the basis of cost-effectiveness and describing the practicalities of delivering improvements.</p> <p>Guidelines for risk analysis and state-of-the-art of risk acceptability.</p> |

C4 Technical reports

24 Technical reports over a 15 years period !

- 1995 : The First Road Tunnel
- 1995 : Classification of Tunnels
- 1996 : Road Tunnels: Emissions, Environment, Ventilation
- 1996 : Road Safety in Tunnels
- 1999 : Road Tunnels: reduction of Operating Costs
- 1999 : Fire and Smoke Control in Road Tunnels
- 2000 : Pollution by Nitrogen Dioxide in Road Tunnels
- 2002 : Cross Section Geometry in Uni-directional Tunnels
- 2003 : Traffic Incident Management Systems used in Road Tunnels
- 2004 : Road Tunnels: Vehicle Emissions and Air Demand for Ventilation
- 2004 : Good Practice for the Operation and Maintenance of Road Tunnels
- 2004 : Cross Section Design for Bidirectional Road Tunnels
- 2007 : Systems and equipment for fire and smoke control in road tunnels
- 2007 : Guide for organising, recruiting and training road tunnels operating staff
- **2007 : Integrated approach to road tunnel safety**
- **2007 : Risk analysis for road tunnels**
- 2007 : Human factors and tunnel safety regarding users
- 2007 : Direction Signing on a Route incorporating Tunnels
- 2007 : A Guide To Optimising The Air Quality Impact Upon The Environment
- 2007 : An assessment of fixed fire fighting systems
- 2007 : Recommendations to owners and operators of urban tunnels
- **2007 : Tools for tunnel safety management**
- 2007 : Management of the operator-emergency teams interface in road tunnels
- 2007 : Road tunnels : Operational strategies for ventilation

New C4 documents in progress

Documents planned for September 2011 !

- **The PIARC Road Tunnel Manual**
- **12 new technical reports with particularly :**
 - Safety inspections
 - Current practice for risk evaluation in road tunnels
 - Improving safety in existing tunnels

The PIARC Virtual Library : www.piarc.org (1/3)

The screenshot shows the PIARC website interface. At the top, the PIARC logo is on the left, and the tagline "Exchange knowledge and techniques on roads and road transportation" is in the center. Below the tagline, there are language options for Français and Español. A navigation bar contains several menu items: "Keywords", "Virtual Library", "Terminology", "WIN", "Training Organisations", and "Links". The "Virtual Library" item is circled in red. Below the navigation bar, there are five main content boxes: "All PIARC publications", "Multilingual technical dictionaries", "The World Interchange Network", "Training courses in the road sector", and "Organisations active in the road sector". The "All PIARC publications" box is highlighted with a red circle. Below these boxes, there is a welcome message and a list of services including "PIARC Software", "Road Asset Management", "Network Operations", and "PARIS 2007". A sidebar on the left contains various links such as "About PIARC", "National Committees", "Technical Committees", "Congresses & Seminars", "Joining PIARC", "Calendar", "Subscribe to the E-news", "National Committees Newsletter", "Contact us", and "Members area".

WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE AIPCR PIARC

"Exchange knowledge and techniques on roads and road transportation"

Français Español

PIARC Website

VIRTUAL LIBRARY

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Subject

SEARCH

Display only documents in English French Spanish

TRY THE [ADVANCED SEARCH FORM](#)

Search results

Sort the results by

Results 1 to 10 out of 34 [The 10 next results >>](#)

Management of the operator - Emergency teams interface in road tunnels

| Date | Language(s) | Format(s) | Number of pages | |
|------|-------------|-----------|-----------------|-------------------------|
| 2008 | | 631 Ko | 75 | Details |

Risk analysis for road tunnels

| Date | Language(s) | Format(s) | Number of pages | |
|------|-------------|-----------|-----------------|-------------------------|
| 2008 | | 1557 Ko | 245 | Details |

Road tunnels: an assessment of fixed fire fighting systems

| Date | Language(s) | Format(s) | Number of pages | |
|------|-------------|-----------|-----------------|-------------------------|
| 2008 | | 651 Ko | 79 | Details |

Road tunnels: a guide to optimising the air quality impact upon the environment

| Date | Language(s) | Format(s) | Number of pages | |
|------|-------------|-----------|-----------------|-------------------------|
| 2008 | | 1200 Ko | 179 | Details |

Effects of pavement on fires in road tunnels

| Date | Language(s) | Format(s) | Number of pages | |
|------|-------------|-----------|-----------------|--|
| | | | | |

TUNNELS ROUTIERS :
ÉVALUATION DES SYSTÈMES FIXES DE LUTTE CONTRE L'INCENDIE

Foyer de l'incendie

ROAD TUNNELS
AN ASSESSMENT OF FIXED FIRE FIGHTING SYSTEMS

Fire location

Figure 3. Exemple de schéma illustrant les conditions de ténabilité [11]

► **5.3. PRINCIPALES CONCLUSIONS SUR L'INTERACTION AVEC LA VENTILATION**

Le domaine des SFLI étant sans cesse en cours de développement et d'innovation, il est très difficile de fixer des critères généraux ou de formuler des recommandations qui permettent d'améliorer le niveau de sécurité global tout en ne perturbant pas les « meilleures conditions possibles » fournies par le système de ventilation. Les risques spécifiques doivent être évalués dans les conditions spécifiques de chaque projet, au moyen d'une analyse des risques, d'une approche fondée sur des scénarios ou d'autres techniques adaptées aux caractéristiques particulières du tunnel et du SFLI choisi.

Toutefois, quelques observations générales concernant l'interaction entre les SFLI et les systèmes de ventilation peuvent être formulées pour quelques scénarios clés.

Figure 3 - Example of a tenability condition diagram [11]

► **5.3. PRIMARY FINDINGS ON INTERACTION WITH VENTILATION**

Continuous development and innovation in the field of FFFS makes it extremely difficult to give general criteria or recommendations for improving the global safety level, yet not disturbing the “best possible conditions” provided by the ventilation system. Specific risks must be evaluated on a project-specific basis using risk analysis, a scenario-based approach or other techniques adapted to the particular characteristics of the tunnel and of the FFFS alternative selected.

However, some general observations concerning the interaction between FFFS and ventilation systems can be made for a few key scenarios.

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**Thank you for
your attention !**