WORLD ROAD ASSOCIATION
ACTIVITY REPORT 2008 - 2011

FROM THE PARIS CONGRESS (SEPTEMBER 2007)
TO THE MEXICO CONGRESS (SEPTEMBER 2011)

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PRESIDENT'S FOREWORD

When I was elected President at the end of 2008, I promised to devote myself to the future of our Association by harnessing the dynamism and commitment of its members and bodies. I also wished to explore a number of avenues that not only aimed to consolidate the Association's achievements, but also mobilize the global road community to face the challenge of maintaining the fragile equilibrium, which exists between social development, economic vitality and preservation of the environment. The Congress provides a good opportunity for a progress report.

One of my first wishes on starting my term of office was for the Association to listen to its members in order to be able to meet their expectations. In this spirit, the way the **Council** and **Executive Committee** meetings are organized was changed in order to encourage active participation on the part of member governments and promote discussions on the issues and challenges facing them.

The adoption of the **Strategic Planning Commission's** proposal that the Chairs of the Technical Committees should be appointed at the time of the Congress will make it possible to optimize the transition from one work cycle to the next. To permit this, the considerable amount of work involved in developing the next strategic plan was conducted in a much shorter timeframe than in the past.

The knowledge exchange and sharing which the Association has taken upon itself has received attention from the **Communication and International Relations Commission** in order to ensure that information circulates freely, that it meets the needs of members and is accessible at all times. The Commission's communication and marketing plan provides for the National Committees to be involved in disseminating the work of the Association.

During these four years, the work of the **Technical Committees** has followed the four Strategic Themes of the Association's fourth Strategic Plan: sustainability of the road transport system, improving provision of services, safety of the road systems and quality of road infrastructure. The Technical Committees, which are the driving force of the Association, have dealt with some issues that are of major importance for member organizations. By the time of the Congress, they will have delivered reports setting out the results of their work and shared their knowledge via the Association's various communication forums (seminars, articles and congresses).

In order to make **international collaboration** the cornerstone of progress in road transport, the Association has strengthened its ties with a number of bodies and countries. Whether through the Memorandum of understanding signed with REAAA, the agreement reached with the Indian Roads Congress or the close ties that have developed with the Nordic Road Association, the CEDR, DIRCAIBEA and AGEPAR, the Association has consolidated and extended its links with national and international roads communities.

As far as **road safety** is concerned, the Association is keen to become a major forum for the exchange of ideas. In this connection, it has underscored its commitment within the global road community by formulating a declaration in support of the United Nations Decade of Action for Road Safety.

The **International Winter Road Congress** held in Quebec City in February 2010 belongs to the long list of successful events organized by the Association. With as its theme "Sustainable Winter Service for Road Users", it attracted some 1 500 participants from 44 countries. The exhibition that was held on the fringe of the congress provided the opportunity for almost 500 persons from 175 firms and bodies from

America, Europe and Asia to present their know-how, including the technologies they are developing and the machine parts they manufacture or distribute.

With the theme of “Roads for a better life: Mobility, Sustainability and Development”, **the Mexico World Road Congress** will be concerned with the political, strategic and technical challenges facing the transport sector and roads. The global road community will be able to use this event to demonstrate its ability to respond to the aspirations of society and implement a fully responsible approach: how can we satisfy demand today without adversely affecting the potential for tomorrow? How can we reconcile demand for infrastructure, which is still considerable at a global level, with the need to safeguard the planet’s major equilibria?

The Congress is not only the culmination and summary of four years of remarkable work by several hundred persons representing 118 member governments and drawn from 32 National Committees from all over the world, but it also launches the next work cycle.

The 2012-2015 Strategic Plan continues the reform process which got under way in the cycle that is drawing to a close and that aimed to respond as well as possible to the expectations of the Association’s members by putting in place mechanisms that make it easier for them to contribute and which simplify access to the results of the Association’s work. The 18 Technical Committees will work on current issues in the area of roads and transport systems. These are grouped in four Strategic Themes that focus on, respectively, management and performance, accessibility and mobility, safety, and, lastly, infrastructure.

Behind us, lies a century of progress and achievements that have helped provide sustainable, safe and environmentally-friendly mobility for all. The proceedings of the Congress and the next cycle’s work will reinforce the efforts THE WORLD ROAD ASSOCIATION has made in the last 100 years to remain the principal forum for discussions and the exchange of views in the sphere of transport.

The different sections of this report set out the principal features of the last cycle and we therefore recommend it to your attention. It reflects the involvement of the members and the unfailing support of their organizations. I would like to express my gratitude to all those who, both now and in the past, have believed in the World Road Association’s mission and shown themselves willing to invest the necessary time and resources to ensure the Association’s success at an international level.

Anne-Marie LECLERC
President of the World Road Association (PIARC)

1. GOALS AND ACTIVITIES CONSISTENT WITH NEEDS

1.1. History and role of the Association

Founded in 1909 following the first International Road Congress held in 1908 in Paris, PIARC (Permanent International Association of Road Congresses) is the oldest international association in the road sector. It was renamed World Road Association in 1995. the World Road Association is a non-profit, non-political association. Its goal is to develop international cooperation and foster progress in the area of roads and road transport.

Founded by 15 countries, the World Road Association has 118 government members, as at October 1st 2010, as well as other members (regional authorities, collective members and individual members) from some 140 countries approximately.

Since 2007, five new governments were admitted as members of the Association: Moldavia, Monaco, Niger, Singapore and Cyprus.

The World Road Association (PIARC) 118 National Member Governments (*January 2011*)

ALGERIA	IVORY COAST	KUWAIT	RUSSIA
ANDORRA	CROATIA	LATVIA	SALVADOR)
ANGOLA	CUBA	LITHUANIA	SAUDI ARABIA
ARGENTINA	CYPRUS	LUXEMBOURG	SENEGAL
AUSTRALIA	CZECH Rep.	MADAGASCAR	SINGAPORE
AUSTRIA	DENMARK	MALAYSIA	SLOVAK REPUBLIC
AZERBAIJAN	DOMINICAN Rep.	MALI	SLOVENIA
BANGLADESH	ECUADOR	MAURITANIA	SOUTH AFRICA
BELGIUM	EGYPT	MAURITIUS	SPAIN
BENIN	ESTONIA	MEXICO	SRI LANKA
BHUTAN	FINLAND	MOLDAVIA	SWAZILAND
BOLIVIA	FRANCE	MONACO	SWEDEN
BRAZIL	GABON	MONGOLIA	SWITZERLAND
BULGARIA	GERMANY	MOROCCO	SYRIA
BURKINA FASO	GHANA	NAMIBIA	TANZANIA
BURUNDI	GREECE	NEPAL	THAILAND
CAMBODIA	GUATEMALA	THE NETHERLANDS	TOGO
CAMEROON	GUINEA	NEW ZEALAND	TONGA
CANADA	HONDURAS	NICARAGUA	TUNISIA
CANADA-QUEBEC	HUNGARY	NIGER	TURKEY
CAPE VERDE	ICELAND	NORWAY	UGANDA
CHAD	INDIA	PAKISTAN	UKRAINE
CHILE	INDONESIA	PANAMA	UNITED KINGDOM
CHINA (PEOP. REP.)	IRAN	PAPUA NEW GUINEA	UNITED STATES
COLOMBIA	IRELAND	PARAGUAY	URUGUAY
CONGO (REP.)	ISRAEL	PERU	UZBEKISTAN
CONGO (DEM REP)	ITALY	PHILIPPINES	VENEZUELA
COSTA RICA	JAPAN	POLAND	VIET NAM
	KENYA	PORTUGAL	YEMEN
	KOREA (Rep.)	ROMANIA	ZIMBABWE

Since 1995, the World Road Association **(**PIARC) activities—funded by the fees from its membership — have been driven by strategic plans that are developed for a four-year period.

Although technical road matters naturally still play a significant part, the World Road Association also addresses economic and environmental matters, road safety, road infrastructure financing, as well as the changing organisation and roles of the Road Administrations, which are all central to current concerns of public authorities and professionals in the road and road transport sector.

The World Road Congresses -- the World Road Association's initial reason for being—as well as the International Winter Road Congresses are organised every four years. Both events provide opportunities to review the state of the art and practices and have forward-looking discussions to give direction to our action in the years to come.

For over fifty years, the World Road Association's work has been supported by Technical Committees that represent the areas of study and discussion forums and bring together experts from the member countries.

1.2. Strategic Plan 2008-2011

1.2.1. The World road Association's Mission, Values and Vision

The World Road Association's purpose, mission, values and vision, as identified in 1995, are still considered to be relevant.

The World Road Association exists to serve all its members by:

- being a leading international forum for analysis and discussion of the full spectrum of transport issues relating to roads and road transport,
- identifying, developing and disseminating best practices and facilitating improved access to international information,
- fully considering within its activities the needs of developing countries and countries in transition,
- developing and promoting efficient tools for decision making on matters related to roads and road transport,
- providing advice on directions to the world's transportation system.

The World Road Association's values are:

- to provide universal quality service to its members,
- to be open, objective and impartial,
- to promote the development of sustainable solutions,
- to recognise road transport in an integrated transport and land use context,
- to be customer driven,
- to respect the differing international road transport needs.

1.2.2. Strategic Objectives

Just like the three previous four-year plans, the 2008-2011 Strategic Plan was developed out of a survey of the First Delegates of the member governments, a consultation of the outgoing Technical Committees and the National Committees, and the conclusions of the previous Congress held in Paris in 2007. The Strategic Plan organizes the activities of the 17 Technical Committees in four Strategic Themes:

- Strategic Theme A: Sustainability of the Road Transport System;
- Strategic Theme B: Improving Provision of Services;
- Strategic Theme C: Safety of the Road System;
- Strategic Theme D: Quality of Road Infrastructure;

Besides the 17 Technical Committees, mention needs to be made of the Committee on Terminology whose activity runs across all themes.

In addition to the issues assigned to the Technical Committees, the 2008-2011 Strategic Plan has also defined a series of organisational goals to help the World Road Association fulfil its mission. These goals, listed below, have been translated into strategies for action:

1. Goal 1: To continuously improve the management and operation of The World Road Association in order to provide members with a service that represents good value for money.

2. Goal 2: To promote cooperation with regional organisations of road authorities and with other international organisations with related goals.

3. Goal 3: To develop and encourage professionally worthwhile and effective personal contact networks.

4. Goal 4: To host major Congresses that are valuable events for setting direction for the future, provide knowledge exchange and networking opportunities among members of the road transport community, and develop a range of options that are viable from the World Road Association's point of view.

5. Goal 5: To build and strengthen the activity and visibility of the Association at the national level.

6. Goal 6: To develop practical means for efficient and effective knowledge transfer among countries.

7. Goal 7: To improve participation of member governments, and to increase the number of members of the road community benefiting, whether through National Committees or by direct participation, in the World Road Association Technical Committees.

8. Goal 8: To produce and disseminate authoritative, impartial and interesting publications and products that address current road and road transport issues.

9. Goal 9: To put transparent and rigorous financial management of the Association in the service of its purpose and to optimise its resources in order to meet future challenges.
10. Goal 10: To identify, develop and promulgate policy and practices that contribute to safer and more effective management and use of road and road transport systems within an integrated sustainable transport context.

2. STRUCTURE OF THE ASSOCIATION

The following diagram outlines the way the Association operates for the period 2008–2011.

32 National Committees

Council of the World Road Association
President
Former President
Members
Delegates from the 118 Governments
Representatives of the National Committees

Executive Committee
President
Former President
3 Vice-Presidents
23 members including
1 Representative of the National Committees

General Secretariat

Commissions
- Finance
- Communication and International Relations
- Strategic Planning
- Technological Exchanges and Development

Strategic Theme A Sustainability of the Road Transport System		Strategic Theme C Safety of the Road System	
A.1	Preserving the Environment	C.1	Safer Road Infrastructure
A.2	Financing, Managing and Contracting of Road System Investment	C.2	Safer Road Operations
A.3	Road System Economics and Social Development	C.3	Managing Operational Risk in Road Operations
A.4	Rural Road Systems and Accessibility to Rural Areas	C.4	Road Tunnel Operations
Strategic Theme B Improving Provision of Services		**Strategic Theme D Quality of Road Infrastructure**	
B1	Good Governance of Road Administrations	D.1	Management of Road Infrastructure Assets
B2	Road Network Operations	D.2	Road Pavements
B3	Improved Mobility in Urban Areas	Sub committees	
B4	Freight Transport and Inter Modality	D.2.a	Road surface characteristics
B5	Winter Service	D.2.b	Flexible and semi-rigid pavements
		D.2.c	Concrete pavements
		D.3	Road Bridges
		D.4	Geotechnics and Unpaved Roads
Committee on Terminology			

2.1. The World Road Association's Council

The Association is governed by the Council, which is made up of delegations from member governments, each led by a First Delegate, and representatives from the National Committees. The Council meets once a year.

During the period 2008-2011, the most important decisions made by the Council were as follows:

Marrakech, 29-30 October 2008

- Anne-Marie Leclerc (Canada-Quebec) was elected President of the World Road Association for the period running from 1st January 2009 to 31 December 2012. She took over this post from Colin Jordan (Australia).
- The members of the Executive Committee and the Vice-Presidents: Oscar De Buen (Mexico), Keiichi Inoue (Japan), Marc Papinutti (France) were elected for the period 2009-2012.
- The Council accepted the membership requests from the Republic of Moldavia, the Republic of Niger, the Republic of Singapore and the Principality of Monaco.
- The 2008-2011 Strategic Plan was definitively approved.
- The Council approved the increase in government membership fees for 2009.

Incheon, 24-25 September 2009

- The Council approved the signing of the Memorandum of understanding with the Road Engineering Association of Asia and Australasia (REAAA).
- The Council approved the membership request from the Republic of Cyprus.
- The Council selected Andorra to organize the XIVth International Winter Road Congress.

Budapest, 20-22 October 2010

- The Council approved the principle of trialling a regional organization in some parts of the world with a few pilot Technical Committees;
- The Council gave the Executive Committee the green light to appoint, in 2011, the Strategic Theme Coordinators for the 2012-2015 work cycle after a call for nominations from member countries.
- The Council selected the application from Seoul (Republic of Korea) to organize the XXVth World Road Congress in 2015, and thanked Italy and the Czech Republic for their excellent proposal.

2.2. Executive Committee

The Executive Committee meets at least twice a year and is in charge of supervising management of the Association. As of January 1st 2009, the Executive Committee Members have been as follows:

President	Anne-Marie LECLERC	Canada-Québec
Former President	Colin JORDAN	Australia
Honorary Presidents	Enrique BALAGUER	Spain
	Victor MAHBUB	Mexico
	Olivier MICHAUD	Switzerland
	Hiroshi MITANI	Japan
Vice-Presidents	Marc PAPINUTTI	France (until October 2010)
	Keiichi INOUE	Japan
	Oscar DE BUEN	Mexico (until March 2011)
Members	Gunyaziwe MAKAULA	South Africa (until March 2011)
	Josef KUNZ	Germany
	Julio César ORTIZ	Argentina
	Menno HENNEVELD	Australia
	Claude VAN ROOTEN	Belgium
	Tchona IDOSSOU	Burkina Faso
	Bryce CONRAD	Canada (until September 2009)
	Martin LELIEVRE	Canada (from September 2009 to March 2011)
	Mario FERNANDEZ	Chile
	Dong-chang DAI	China
	Jai-Soo KANG	Republic of Korea (until October 2010)
	Sung-Hwan KIM	Republic of Korea (from October 2010)
	Jeffrey PANIATI	United States of America (USA)
	Christophe SAINTILLAN	France (from October 2010)
	Hreinn HARALDSSON	Iceland/NVF
	Riccardo FORMICA	Italy
	Abdul Karim bin JUDIN	Malaysia
	Hicham N'HAMMOUCHA	Morocco
	Gheorghe LUCACI	Romania
	Jim BARTON	United-Kingdom (UK)
	Peter PENGAL	Slovenia (until September 2009)
	Bojan LEBEN	Slovenia (from September 2009)
	Carlo MARIOTTA	Switzerland
	Joseph Odo HAULE	Tanzania
Representative of the National Committees	M. Friedrich ZOTTER	Austria
Secretary General	M. Jean-François CORTÉ	France

The Executive Committee held the following meetings:

2008 – Québec (Canada-Québec), 12-13 February; Helsinki (Finland) 12 June; Marrakech (Morocco), 30 October;
2009 – Mexico (Mexico), 4-5 March; Glasgow (United Kingdom) 5 June;
2010 - Québec (Canada-Québec), 11-12 February; Budapest (Hungary) 19 October;
2011 – Perth (Australia) 5-6 April; Mexico City (Mexico) 23 September;

The important subjects covered in the Executive Committee meetings include:

Implementation of the 2008-2011 Strategic Plan

- creating the Technical Committees for 2008-2011: finalizing the terms of reference, appointing the Chairs and the English, French and Spanish speaking secretaries;
- appointing the Chairs and members of the 4 Commissions and approving their action plans and work programmes for the period 2009-2012;
- orienting and overseeing the activities of the Themes and Technical Committees.

Congress

- Approval of the programme of the XXIVth Winter Road Congress to be held in Mexico City in 2011: Ministers' Session, the topics for the Special Sessions and the Strategic Direction Sessions, and for the call for individual papers;
- The terms of reference for the call for applications for organizing the XIVth international Winter Road Congress in 2014;
- Validation of the requirements and issuing the call for applications for organizing the XXVth World Road Congress in 2015;
- Examination of the Memorandum of understanding with Korea for organizing the XXVth World Road Congress in 2015 with a view to its validation by the Council and signing in Mexico City.

Preparation of the 2012-2015 Strategic Plan

- Modification of the timetable for the appointment of the Strategic Theme Coordinators, Chairs and Secretaries of the Technical Committees;
- Conducting a review of the project to redesign the Road Safety Handbook that was placed in the hands of a specially formed working group;
- Preparation of the Strategic Plan 2012-2015 for validation by the Council and signing in Mexico City.

Communication and international relations

- Approving the communication and marketing plan;
- Drawing up the action plan to celebrate the Association 's centenary;
- Drafting and approval of a framework for a memorandum of understanding and a process for recognizing an existing national or regional organization as acting as a National Committee;
- Preparing the declaration committing the Association to participating in the United Nations' Decade of Action for Road Safety.

2.3. Commissions

Four Commissions assist the Executive Committee in its tasks:

1. Finance Commission,
2. Communication and International Relations Commission,
3. Strategic Planning Commission,
4. Technological Exchanges and Development Commission

2.3.1. The Finance Commission

The Commission, which is chaired by Mr Carlo Mariotta (Switzerland) *(picture),* is jointly responsible, with the General Secretariat, and subject to the approval of the Executive Committee, for managing all aspects/items related to the use of the Association's funds. During this period, in accordance with Goal 9 of the Strategic Plan, which is to achieve transparent and rigorous financial management of the Association, the Commission has focused on, in particular:

- the previous year's accounts (approval of accounts that have been closed);
- implementation of the budget for the current year;
- the draft budget for the following year;
- financial considerations relating to the Mexico City Congress and the Quebec City and Andorra Winter Road Congresses.

A very healthy financial situation

The financial policy the Council adopted in 2005 has been continued in 2008-2011, resulting in an increase in the level of the Association's own funds, due to the increase in membership fees that was decided in 2005, to Congress revenues, and to continuing prudence over expenditure. As a result, an increase in individual and collective membership fees was avoided and all that was required was a limited readjustment of government membership fees in 2008.

Annual membership fees for the 2008-2011 period

- **Government membership fees**

Membership category	**Government membership fees (in euros)**		
	For reference: 2006-2007 membership fee	2008	2009-2011
A	17 700	18 750	19 350
B	10 750	11 400	11 800
C	6 700	7 100	7 300
D	4 300	4 550	4 700
E	2 500	2 650	2 750

- **Individual and collective members fees**

	Membership fees (euros)	
	For reference: 2007 membership fee	2008-2011
Collective Member		
high income countries	440	455
Other countries	270	280
Individual members		
High income countries	54	56
Other countries	27	28

2.3.2. Communication and International Relations Commission

The Communication and International Relations Commission, under the chairmanship of Menno HENNEVELD (Australia) *(picture),* held its first meeting on 2 and 3 June 2009 in Glasgow (United Kingdom). This meeting decided on the Commission's work programme with reference to the general goals that have been assigned to it, namely:

- increase awareness and recognition of the Association as an international forum for the exchange of information and knowledge;
- widely disseminate the output of the Technical Committees;
- increase membership.

An active communication policy

In order to increase participation in the Association's activities and build up membership, the Commission has developed a communication and marketing plan, which was put before the Executive Committee and the Council in Budapest. This document will structure the Association's activities in these areas in the coming years

Working in partnership with the General Secretariat, the Commission has produced a set of information and promotion documents on the Association, which include a presentation brochure, a guide for First Delegates and documents on the benefits that are offered to members.
With regard to the Association's communication resources, the Commission, working with the General Secretariat, decided on the content of satisfaction surveys that have been conducted among the readership of Routes/Roads and visitors to the public area of the website. These surveys were conducted in the first quarter of 2010. The results were then analyzed and used to identify measures, which have since been put in place.

Broadening the Association's audience and encouraging partnerships

The Commission has submitted a set of proposals to the Executive Committee to foster interest and involvement in the activities of the Association among young professionals.

The Commission has monitored the implementation of the protocols of agreement the Association has signed with other international organizations and performed the groundwork for new agreements (REAAA, DIRCAIBEA, Nordic Road Association).

The Commission has defined the rules of the World Road Association Prizes Competition. The Prizes will be awarded to the best individual papers selected for the XXIVth World Road Congress in Mexico City in 2011.

THE WORLD ROAD ASSOCIATION Prizes Competition 2011

This competition, which aims to heighten the profile of the road sector and promote the World Road Association's activities, elicited a large number of entries.

After a preliminary selection by member countries, 41 essays from 28 countries were sent to the international jury, which was chaired by Menno Henneveld and made up of J.-F. Corté (World Road Association General Secretariat), and a representative of each country that is sponsoring one of the prizes: Menno Henneveld (Australia/New-Zealand), Claude van Rooten (Belgium), Christian Therrien (Canada-Québec), Patrick Mallejacq (France), Hirofumi Ohnishi (Japan), Joe Burns (United Kingdom), Keechoo Choi (Korea) and Butch Wlaschin (United States).

These essays were l competing for one of the following eight prizes: road construction and design, road maintenance and operation, road safety, sustainable development, intermodality, young professionals, developing countries, and the Maurice Milne medal for the most innovative idea.

The results of the competition will be announced at the opening session of the Mexico City Congress.

2.3.3. Strategic Planning Commission

The Strategic Planning Commission, chaired by Jim Barton *(picture),* met for the first time on 3-4 June 2009 in Glasgow (United Kingdom). During this meeting, the work programme was refined. The Commission is responsible for:

- overseeing the implementation of the current strategic plan,
- deciding on the technical programme for the 2011 World Congress in Mexico City,
- revising the statutory documents,
- preparing the 2012-2015 Strategic Plan.

The Strategic Planning Commission includes the Strategic Theme Coordinators, who are chosen from the Executive Committees, and has the task of advising the Technical Committees that relate to their theme and ensuring the work is conducted in accordance with the goals set out in the Strategic Plan.

For the period 2008-2011, the Strategic Themes coordinators have been as follows:

A. Sustainability of the Road Transport System	Mr Dong-Chang DAI, then Mr Hicham N'HAMMOUCHA	China, Morocco
B. Improving Provision of Services	M. Keiichi INOUE	Japan
C. Safety of the Road System	M. Jeffrey PANIATI	United States of America
D. Quality of Road Infrastructure	M. Gheorghe LUCACI	Romania

Streamlining the operation of the Association and introducing innovative working methods.
The Commission has drawn up a set of proposals for improving the quality of the output of the Technical Committees and working procedures (a more precise definition of the role of the Theme Coordinators and the Technical Advisors).

To make it possible for work to start more quickly after the beginning of the cycle, the timetable for the appointment of the Strategic Theme Coordinators, the Chairs and Secretaries of the Technical Committees has been modified.

These proposals have been added the members' guide ("Blue Guide").

In addition, at the initiative of the Strategic Planning Commission, the Executive Committee will submit a proposal to the Council in Mexico City to organize activities regionally in some parts of the world, on a trial basis during the 2012-2015 cycle and with a limited number of pilot Technical Committees. The four geographical regions that have been selected for trialling regional groups are: Latin America, French-speaking Africa, English-speaking Africa, Australasia and Asia.

In order to produce a new version of the Road Safety Manual that promotes a holistic approach to the topic, the Commission has planned to set up a specific study group led by the coordinator of Strategic Theme C and the General Secretariat.

A Strategic Plan for 2012-2015 that meets the new aspirations of the member countries

Preparation of the draft 2012-2015 Strategic Plan involved an iterative process of debate and consultation which expressed the concerns of member countries in the terms of reference of the new Technical Committees (for example road safety, responsibility with regard to climate change, a sustainable approach to mobility, risk management, and an intermodal approach to transport needs). The Executive Committee will present the draft to the Council for approval in Mexico City.

2.3.4. The Technological Exchanges and Development Commission

The Technological Exchanges and Development Commission chaired by Abdul Karim JUDIN (Malaysia) *(picture),* met for the first time on 27 and 28 April 2009 in Kuala-Lumpur (Malaysia).
In line with its responsibility for Goal 6 on knowledge transfer, during the cycle the Commission has:

- established, with the General Secretariat, the main directions for restructuring the Association's website with a view to improving access to THE WORLD ROAD ASSOCIATION's output, and encouraging the sharing of knowledge and experience;
- added to the directory of training organizations that is available on the website;
- supervised the programme of international seminars;
- supervised use of the Special Fund, which provides individual financial aid to help members from countries with low-income economies take part in the Association's activities. In this connection, between 2008 and 2010, 108,000 Euros were used to finance the attendance by 80 persons from 24 countries at meetings of Technical Committees, the Council, the Executive Committee and other Commissions, as well as seminars;
- developed contacts with other international organizations with a view to identifying synergies for action.

In the next cycle, an expert working group will be set up to deal with knowledge transfer instead of a Commission, and the remaining duties of the Technological Exchanges and Developing Commission will be divided between the other Commissions on the basis of their nature.

2.4. National Committees

The Association encourages the creation of National Committees in order to:

- represent it at a national level;
- widen its audience and increase participation in the activities of the Association;
- achieve wide dissemination of the results and recommendations arising from its work.

On 1st January 2011, there were 32 ***National Committees***.

The Chairs and Secretaries of the National Committees meet once a year at a date that coincides with the Council meeting under the chairmanship of Mr. Friedrich Zotter (Austria) *(picture),* who, in 2008, was elected representative of the National Committees on the Executive Committee.

At the national level, the National Committees organize a variety of meetings, for example workshops and seminars, either on their own or in collaboration with the Technical Committees, National Road Administrations or other organizations.

In 2008 – 2011, ***promotion and information*** operations with regard to the role and activities of the National Committees continued and intensified with:

- dissemination of the quarterly electronic newsletter which is published in French, English and Spanish; the General Secretariat is responsible for the layout and putting the newslettter on the website;
- development, in partnership with the General Secretariat, of a framework memorandum of understanding to allow recognition that an existing body acts as a National Committee. This document was approved by the Council in Budapest in October 2010;
- the corresponding modification of the Guide on the creation of a National Committee;
- introduction of a section dealing with National Committees in *Routes/Roads* .

In addition, in 2009, a very large number of the National Committees organized an event to mark **the Association's centenary**. This took a variety of forms (conferences, workshops associated with another conference, books and papers,…) particularly in Australia, Austria, Belgium, Burkina Faso, Canada, Spain, France, Japan, the Baltic Countries, Quebec, Romania, Slovenia and Switzerland.

2.5. General Secretariat of the World Road Association

The World Road Association General Secretariat's team comprises salaried administrative staff of the Association and executives seconded to the Association by several member countries.

As of July 1st 2011, the General Secretary of the Association comprises:

- The General Secretary, Jean-François CORTÉ, whose term of office was extended until 31st December 2012 by the Executive committee in Budapest in October 2010;
- A Deputy General Secretary, Jean-Marc PHILIPPEAU, who took up his post in September 2010, taking over from Franck CHARMAISON whose secondment ended in February 2010;

Both are seconded to the Association by the French government.

- Six salaried administrative staff (on the Association's payroll)
    - Véronique ANSELIN, Director's Assistant, since 1985
    - Marie PASTOL, Translator/Interpreter, since 1991
    - Nathalie SABBAH, Assistant, since 1995
    - Cécile AUROUSSEAU, Publications Assistant, since 1997
    - Céline LE GRACIET, Publications Advisor, since 2004,
    - Hanitra RABETALIANA, accountant and management assistant, since 2008.

  Roger APHAREL who worked as an accountant for the Association for fifteen years, retired in June 2010.

- Five technical advisors seconded by Austroads, Spain, Japan, the Republic of Korea and the Nordic Road Association (NVF) are seconded for periods varying from 9 months to more than 2 years. On an exceptional basis, other advisors coming from other countries can also be seconded: this was the case with Ivory Coast from 2007 to 2008.

Tours of duty among the technical advisors have been as follows during the relevant period of this report:

- Toussaint AGUY (Ivory Coast) worked at the General Secretariat from January 2007 to November 2008;
- Hye-Ok LEE, very first Technical Advisor from the Republic of Korea, worked at the General Secretariat from November 2009 until mid-January 2011). Byeong-Jin LEE took over in January 2011;
- Secondments by NVF: Arve KIRKEVOLD (Norway; January to October 2007); Fredrik FRIBERG (Sweden; October 2007 to December 2008); Sanna KOLOMAINEN (Finland; January 2009 to February 2010); Johanne SOLHEIM (Norway; February to December 2010); Carolina THEOLIN-PALMELL (Sweden; since January 2011);
- Secondments by Austroads: Leanne GRANT (October 2007 to June 2008); Michelle BARAN (June 2008 to March 2009); Jeremy KALTENRIEDER (March 2009 to February 2010); Mozelle Morisson (February 2010 to October 2010); Claire MURDOCH (since October 2010);
- Secondments by Japan: Masamitsu Waga (October 2006 to October 2008); Masaki TSUBOUCHI (October 2008 to October 2010); Yasuyuki MATSUMOTO (since October 2010);
- Miguel CASO-FLOREZ (Spain) has been working at the General Secretariat since 2005.

Pictures from left to right : Byeong-Jin LEE, Carolina THEOLIN-PALMELL, CLAIRE MURDOCH, YASUYUKI MATSUMOTO, MIGUEL CASO-FLOREZ

3. THE ASSOCIATION'S ACTIVITIES IN 2008-2011

3.1. Technical Committees

Eighteen Committees were set up and organized on the basis of the four Strategic Themes in order to deal with the issues identified in the 2008-2011 Strategic Plan. Approximately 1200 experts and decision-makers from almost 60 countries and various international organizations took part in the work of the Committees.

Each Committee met approximately twice a year in order to carry through the work programme that was adopted in 2008. In some cases, the meetings were associated with study days, conferences or congresses, which made it possible to achieve more exchanges outside the Committee and improve dissemination of results.

Prolific activity

The Technical Committees were the backbone of the:

- seminars for developing and transition countries, with the organization of ***26 seminars and workshops***,
- the I***nternational Winter Road Congress,*** in Quebec City in 2010,
- the ***SURF2008*** symposium on surface characteristics, held in Portoroz (Slovenia) in 2008. More information on these events is given in Section 4.4.

For the 2007-2011 cycle, which is drawing to a close, the Technical Committees have announced the production of ***54 technical reports,*** the first of which were sent to the General Secretariat for publication at the end of the first half of 2011.

This section will merely give a brief survey of the goals and terms of reference, which were given to the Technical Committees in the 2007- 2011 Strategic Plan. Detailed information on the activity of all the Technical Committees and their output during 2008-2011 is given in the individual committee reports which are annexed to this activity report.

3.1.1. Theme A - Sustainability of the Road Transport System

Hicham N'HAMMOUCHA (Maroc)
Coordinateur du ST A

The goal of this strategic theme is to encourage the development of road transport policies and programmes that result in beneficial community outcomes for sustainable and safe mobility in economic, environmental and social terms, with special attention paid to energy issues and the mitigation of the impacts on climate from the road transport system.

This theme covers the activities of the following Technical Committees: A.1 (Preserving the Environment), A.2 (Financing, Managing and Contracting of Road System Investments), A.3 (Road System Economics and Social Development) and A.4 (Rural Road Systems and Accessibility to Rural Areas) which have focused on the following issues:

- Identification of national policies for reduction in energy consumption when constructing, maintaining and operating the road transport system;
- Monitoring of environmental impacts of the road transport system and monitoring of alternative solutions for fossil fuel;

- Investigation of approaches to the economic evaluation of mobility pricings effects including managing demand, internalisation of external costs, modal shift and social acceptance;
- Review of the evolving roles of the public and private sectors in the provision of sustainable road systems and the levels of private sector participations in management, maintenance, operations, funding and financing

Technical Committee A1. Preserving the Environment

Chairman: Simon PRICE (United Kingdom)
French-speaking Secretary: Agnès JULLIEN (France)
English-speaking Secretary: Lisa ROSSITER (New Zealand)
Spanish-speaking Secretary: Juan Fernando MENDOZA (Mexico)

Technical Committee A2- Financing, Managing and Contracting of Road System Investments
Chairman: Henri CHUA (United Kingdom)
French-speaking Secretary: Samira IRSANE-SEMAAN (France)
English-speaking Secretary: Mike GOODALE (Canada)
Spanish-speaking Secretary: Gerardo GAVILANES (Spain)

Technical Committee A3 - Road System Economics and Social Development
Chairman: Alberto COMPTE (Spain)
French-speaking Secretary: Maxime JEBALI (France)
Spanish-speaking Secretary: Guillermo TORRES (Mexico)

Technical Committee A4 - Rural Road Systems and Accessibility to Rural Areas
Chairman: Enrique Leon DE LA BARRA (Mexico)
French-speaking Secretary: Tiraogo OUEDRAOGO (Burkina-Faso)
Spanish-speaking Secretary: Eric SICKAM (Papua-New-Guinea)

3.1.2. Theme B - Improving Provision of Services

Keiichi INOUE (Japon)
Coordinateur du ST B

The goal of this theme is to encourage the improvement of services provided to the community by improved operation of the road transport system, integration with other transport modes, good governance and a customer-oriented approach.

This theme covers the activities of the following Technical Committees: B1 (Good Governance of Road Administrations), B2 (Road Network Operations), B.3 (Improved Mobility in Urban Areas), B.4 (Freight Transport and Inter-Modality) and B.5 (Winter Service) which have focused on the following issues:

- Transforming the road administrations into exemplary players of good governance, institutional integrity and performance measurement fostering a customer-oriented approach;
- Examine the understanding of and successful approaches, including the benefits of Intelligent Transport Systems, to managing traffic flow on major urban and interurban roads in congested areas.
- Balancing the share of urban transport modes to reduce congestion and improve mobility in cities. Investigate the best approaches towards integrating the different modes of transport, including non-motorized mobility.
- Ensure safety and sustainability of freight transport: improved management of freight corridors and interfaces of freight transport with other modes.
- Improve winter service and communication with road users in order to ensure safe driving on the road network under difficult weather conditions.

Technical Committee B.1 - Good Governance of Road Administrations
Chairman: Paul VAN DER KROON (Netherlands)
French-speaking Secretary: André BERNARD (France)
English-speaking Secretary: Brendan NUGENT (Australia)
Spanish-speaking Secretary: Carmen PICON (Spain)

Technical Committee B.2 -

Road Network Operations

Chairman: Martial CHEVREUIL (France)
French-speaking Secretary: Alexis BACELAR (France)
English-speaking Secretary: Richard HARRIS (United Kingdom)
Spanish-speaking Secretary: Juan Othon MORENO (Mexico)

Technical Committee B.3 - Improved Mobility in Urban Areas

Chairman: Hubert PEIGNE (France)
French-speaking Secretary: Marc ELLENBERG (France)
English-speaking Secretary: Anita CURNOW (Australia)
Spanish-speaking Secretary: Cecilia OLAGUE (Mexico)

Technical Committee B.4 - Freight Transport and Inter-Modality

Chairman: Hans SILBORN (Norway)
French-speaking Secretary: Benoit CAYOUETTE (Canada-Québec)
English-speaking Secretary: Cecil SELNESS (USA)
Spanish-speaking Secretary: Juan Carlos ESPINOSA (Mexico)

Technical Committee B.5 – Winter Service

Chair: Gudrun OEBERG (Sweden)
French-speaking Secretary: Didier GILOPPE (France)
English-speaking Secretary: Paul PISANO (USA)
Spanish-speaking Secretary: José DEL PINO ALVAREZ (Spain)

3.1.3. Theme C - Safety of the Road System

Jeffrey PANIATI (Etats-Unis)
Coordinateur du ST C

The goal of this theme is to improve the safety and efficiency of the road system, including the movement of people and goods on the network, while effectively managing the risks associated with road transport operations and the natural environment.

This theme covers the activities of the following Technical Committees: C.1 (Safer Road Infrastructure), C.2 (Safer Road Operations), C.3 (Managing Operational Risk in Road Operations) et C.4 (Road Tunnel Operations) which have focused on the following issues:

- Improving road design for vulnerable road users and for urban roads, ensuring a better integration of human factors in road design standards, and improving safety of road workers
- Studying and comparing cost/benefit analyses used by different road administrations for investment in safety schemes.
- Introducing risk management in the road sector; Identifying approaches being used to assess the risks associated with natural disasters, climate changes, man made disasters and security threats.
- Providing a safer tunnel infrastructure; improving operations and maintenance of tunnels; ventilation and fire extinction; integrating human factors in the safety of tunnels.

Technical Committee C.1 - Safer Road Infrastructure

Chairman: Hans-Joachim VOLLPRACHT (Germany)
French-speaking Secretary: Lise FOURNIER (Canada-Québec)
English-speaking Secretary: John DOUGLAS (Australia)
Spanish-speaking Secretary: Roberto LLAMAS (Spain)

Technical Committee C.2 - Safer Road Operations

Chairman: Ahmad FAHRAN Mohd Sadullah (Malaysia)
French-speaking Secretary: Etienne WILLAME (Belgium)
English-speaking Secretary: Paul GUTOSKIE (Canada)
Spanish-speaking Secretary: Jesus LEAL (Spain)

Technical Committee C.3 - Managing Operational Risk in Road Operations

Chairman: Michio OKAHARA (Japan)
French-speaking Secretary: Johanne LEGAULT (Canada-Québec)
English-speaking Secretary: Hiroyuki NAKAJIMA (Japan)
Spanish-speaking Secretary: Gustavo MORENO (Mexico)

Technical Committee C.4 - Road Tunnel Operations

Chairman: Pierre SCHMITZ (Belgium)
French-speaking Secretary: Alexandre DEBS (Canada-Québec)
English-speaking Secretary: Robin HALL (United Kingdom)
Spanish-speaking Secretary: Ignacio DEL REY (Spain)

3.1.4. Theme D - Quality of Road Infrastructure

Gheorghe LUCACI (Roumanie)
Coordinateur du ST D

The goal of this theme is to improve the quality of road infrastructure through the effective management of assets in accordance with user expectations and managers' requests.

This theme covers the activities of the following Technical Committees: D.1 (Management of Road Infrastructure Assets), D.2 (Road Pavements), D.3 (Road Bridges), D.4 (Geotechnics and Unpaved Roads).

Technical Committee D2 was organized in three sub-committees: road surface characteristics, flexible and semi-rigid pavements, and concrete pavements. The three sub-committees while autonomous were called to work on the same issues. This way of working in sub-committees did not prove its effectiveness and therefore will not be renewed for the next cycle.

The Technical Committees have focused on the following issues:

- Improving knowledge of asset infrastructure and its condition in order to plan maintenance and allocate limited ressources accross asset types; conceiving an effective data collection system to help road administrations' budgetary decision-making;
- Reducing time and costs of construction of new road pavements; increasing durability through adequate maintenance and encouraging pavement recycling;
- Review inspection regimes and strategies for assessing the conditions of bridges;
- Analysing the latest techniques for non destructive testing for surveying the condition of structures; analyzing innovative techniques for maintenance and rehabilitation of bridges.
- Encouraging the use of local materials and promoting innovations in the areas of construction and maintenance of unpaved roads in developing countries.

Technical Committee D.1 - Management of Road Infrastructure Assets

Chair: Anita KŰNKEL-HENKER (Germany)
French-speaking Secretary: Ghislaine BAILLEMONT (France)
English-speaking Secretary: Mick LORENZ (Australia)
Secrétaire hispanophone: Jose ORTIZ (Colombia)

Technical Committee D.2 - Road Pavements

Chairman: Michel BOULET (France)
French-speaking Secretary: Guy TREMBLAY (Canada-Québec)
English-speaking Secretary: Suneel N. VANIKAR (USA)

organized in the following three sub-committees:

D.2.a Road surface characteristics

Chairman: Francesca LA TORRE (Italy)
French-speaking Secretary: Luc-Amaury GEORGE (France)
English-speaking Secretary: Peter BRYANT (Australia)
Spanish-speaking Secretary: Rodolfo TELLEZ (Mexico)

D.2.b Flexible and semi-rigid pavements

Chairman: David HEIN (Canada)
French-speaking Secretary: Marie-Thérèse GOUX (France)
English-speaking Secretary: Hyun Jong LEE (Republic of Korea)
Spanish-speaking Secretary: Rafael LIMON (Mexico)

D.2.c Concrete pavements

Chairman: Raymond DEBROUX (Belgium)
French-speaking Secretary: Thierry SEDRAN (France)
English-speaking Secretary: Anne-Séverine POUPELEER (Belgium)
Spanish-speaking Secretary: Juan José OROZCO (Mexico)

Technical Committee D.3 - Road Bridges

Chairman: Satoshi KASHIMA (Japan)
French-speaking Secretary: Pierre GILLES (Belgium)
English-speaking Secretary: Brian HICKS (Canada)
Spanish-speaking Secretary: Pablo DIAZ SIMAL (Spain)

Technical Committee D.4 - Geotechnics and Unpaved Roads

Chairman: Martin SAMSON (Canada)
French-speaking Secretary: Jean-Claude AURIOL (France)
English-speaking Secretary: Alex KIDD (United Kingdom)
Spanish-speaking Secretary: Paul GARNICA (Mexico)

3.1.5. Committee on Terminology

The goals of the Committee on Terminology are as follows:

- Update the existing version of the terminology data base, including ongoing upgrading of the French and English versions of the various dictionaries.
- Increase the number of languages of translation of the various dictionaries in liaison with the member countries of the World Road Association.

Chairman: Daniel VERFAILLIE (Belgium)
French-speaking Secretary: Bernard LOMBARDI (France)
English-speaking Secretary: Martin LAMB (United Kingdom)
Spanish-speaking Secretary: Cristina HIGUERA (Spain)

3.2. Communication

The World Road Association makes its activities and output known by means of a variety of media which complement each other in terms of their content, form and mode of dissemination:

- a website **www.piarc.org**;
- an electronic newsletter;
- Routes/Roads, which is a quarterly printed bilingual magazine (French/English);
- technical reports and other documents produced by the Technical Committees;
- the proceedings of international congresses and seminars organized by the Association;
- communication documents.

3.2.1. The Website

The website has become the main tool for the Association's communication activities and operation.

A more user-friendly public site

The majority of the respondents to the survey of visitors to the public area of the website, undertaken during the first quarter of 2010, were positive about the topics covered. However, the views expressed on some aspects showed there is a need for improvements as regards navigation within the website, readability and the organization of information. The selectivity of the search engine should also be improved.

The General Secretariat has formulated the technical specifications for restructuring the website, based on the Road Knowledge Support System proposal made by the Commission on Technological Exchanges and Development. The aim is to introduce the new version of the website before the Mexico Congress.

An increase in site traffic in the course of the cycle

The number of website visitors has been constantly increasing.

In 2008, the monthly average number of visitors was 5 700, with 17,500 pages visited approximately. These numbers have remained about the same for the following years.
In 2011, year of the World Congress, the figures of the previous years had been reached within six months already: 6 200 monthly visits and 17,400 pages visited!
Peaks of up to 500 visits per day were recorded over the whole period.

The number of visits in the Virtual Library and Terminology websites has also shown an increase:

- Virtual Library: from 2 580 visits/month in 2009 to 3 090 over the first six months in 2011 (with peaks of 250 visits day),
- Terminology: from 1 480 visits/month in 2009 to 1550 over the first 6 months in 2011 (peaks of 120 visits a day).

Regarding the Directory of Professional Training Organizations, the number of visitors has unfortunately remained low: 240 visits/month in 2009; 200 in 2010: and 190 over the first six months of 2011.

3.2.2. The electronic newsletter

An electronic newsletter has been published every 2 to 3 months since June 2005. It aims to draw attention to the events organized by the Association, and provide notification of new publications, etc. It also disseminates the National Committees newsletter, which in 2011 is sent to a readership of 6,000.

3.2.3. "Routes/Roads"

This magazine is the World Road Association's printed vehicle of communication and provides fuller information and descriptions of results than the website **www.piarc.org** and the electronic newsletter.

This bilingual French-English magazine is distributed in 142 pays and has a quarterly print run of 5,700. In addition to overviews (the *"Features"* section), each issue contains a number of short articles presenting news from member countries.

An international magazine that is highly valued by its readership
The survey of the readership of Routes/Roads that was conducted in early 2010 showed that readers were very satisfied with both its content (range of topics and the quality of the articles) and presentation.

Several adjustments were introduced in the page design already in issue 348, October 2010.
A few minor changes will be made to its layout from early 2012.

A number of changes in editorial content have been made since 2008, with the inclusion of the following in each issue:

- since April 2010, there is a section on the National Committees that has so far drawn attention to the activities of the National Committees in Belgium, Burkina-Faso, Korea, Spain, India, Morocco, Mexico and the Czech Republic;
- since April 2011, there is a new section on young professionals: "*Mise en lumière d'un jeune professionnel" / "Spotlights on Young Professionals"*.

In addition, an Editorial Committee was set up at the end of 2010 to advise the General Secretariat on the editorial policy of Routes/Roads.

A double issue of the magazine, No. 336-337 of January 2008 was entirely given over to the Paris Congress, and in particular contains the General Report.

Two thematic issues have been published since the Paris Congress:

- one on road maintenance in Latin America, which was produced jointly with the Council of Iberian and South American Road Directors DIRCAIBEA (No. 339/3rd quarter 2008)
- the other on Intelligent Transport Systems (ITS) (No.351, July 2011), which was prepared with Technical Committee B2 *Road Network Operations*.

3.2.4. Technical Reports

After the Paris Congress in September 2007, the General Secretariat published 55 reports which the Technical Committees had produced during the 2004-2007 work cycle.

For the 2007-2011 cycle, which is drawing to a close, the Technical Committees have announced the production of 54 reports. At the end of the first half of 2011, the very first of these had been sent to the General Secretariat for publication. Publication will be in electronic form as PDF files on the Association's website and will begin in the second half of 2011 and continue in 2012.

To coincide with the Quebec City International Winter Maintenance Congress in 2010, Technical Committee *B5 Winter Service* published the third edition of the

Snow and Ice Databook (2010R03) which presents the state of the art on winter maintenance practices in 25 member countries..

Since the resolution that was adopted by the Council in Beijing in 2005, the technical reports and the articles that are published in Routes/Roads can be accessed by the public free of charge from the "Virtual Library" on the website **http://publications.the World Road Association.org/en/** . In mid-2011, 196 Technical Reports and 120 articles are on line.

Electronic handbooks

The Association has started work on a web-based thematic presentation of the knowledge and output of the Technical Committees in the areas where the World Road Association is active. Two initiatives which constitute pilot operations prior to general application in the coming years are worth mentioning here:

- the updating and creation of an electronic version of the ***Handbook on Intelligent Transport Systems,*** which is available in the Road Network Operations area of the website. This work, which is managed by Technical Committee B2, supplements that which was carried out during the last cycle which resulted in the ***Handbook on Road Network Operation*** *(picture)* ;
- the creation of a ***Handbook on Road Tunnels***, which organizes and presents the Association's entire output in this area. This work has been conducted by Technical Committee C4.

These two projects will be presented to the public at the Mexico City Congress.

Terminology

The Terminology Commission has continued to update the multilingual technical dictionaries and lexicons that are available in electronic format on the World Road Association's website.

Book for the centenary of the Association

In order to mark the centenary of the Association, a book describing 100 years of Congresses has been prepared by a group of historians under the direction of the Secretary General, Jean-François Corté. This book will be presented at Mexico City.

3.2.5. The proceedings of the World Road Congress and Winter Road Congresses

In the first half of 2008, the General Secretariat produced and disseminated the DVD containing the final proceedings of the XXIIIrd World Road Congress held in Paris.

The organizing Committee of the International Winter Road Congress has produced, in collaboration with the General Secretariat, the proceedings of the congress it held in 2010.

The General Secretariat has digitized the proceedings of all the World Road Congresses since the first in 1908. These can be accessed on the new version of the Association's website. Publication on DVD is also a possibility for 2012.

3.2.6. Communication documents

In early 2010, the General Secretariat produced a new presentation brochure for the Association which follows the new graphic charter.
The texts and graphics have been placed at the disposal of the National Committees to enable them to produce a brochure about themselves in their national language.

A document setting out the benefits of membership of the Association has been prepared with the Communication and International Relations Commission and will be distributed at Mexico City.

3.3. Congresses

3.3.1. World Road Congress

The principal goal of the World Road Congresses, which are organized every four years by the Association and a member country, is to bring together decision-makers and experts from the worldwide road and road transport sector to present and discuss recent experience and trends.

The XXIIIrd World Road Congress (Paris, 17-21 September 2007)

The XXIIIrd World Road Congress attracted more than 3,500 participants from 121 countries. Its general theme was "The Choice for Sustainable Development", and the Congress programme included 45 half-day sessions (Technical Committees, Special Sessions, etc.).

The Ministers' Session brought together slightly fewer than 60 Ministers who participated in three roundtable discussions on the topic of "User charging: potential and limits".

In addition, more than 1,500 participants took part in the Congress exhibition which featured almost 200 exhibitors and included 16 national pavilions. the World Road Association had a room for its exhibition, which provided it with a single space to present its output (website, publications, the HDM4 software package) and the activities of the National Committees in sessions held throughout the Congress.

The double issue of Routes/Roads, No. 336-337 of January 2008 was entirely given over to the Paris Congress and presents the General Report.

The final proceedings of the Congress were prepared, published and disseminated in 2008.

XXIVth World Road Congress (Mexico City, 25-30 September 2011)

The XXIV[e] World Road Congress will take place in Mexico City (Mexico) from 26 to 30 September 2011. Its theme will be “Roads for a Better Life” and “Mobility, Sustainability and Development”.

The official languages will be English, French and Spanish.

Information and registration are available on the Congress website, which the host country created and runs: http://www.aipcrmexico2011.org

Apart from the four Strategic Direction Sessions organized by the Theme Coordinators and the eighteen Technical Committee Sessions, the Congress programme includes 13 Special Sessions organized by the World Road Association jointly with other international organizations.

A very successful call for individual papers

The call for individual papers issued by the Technical Committees met with considerable success, and almost 800 proposals of abstracts had been received by the end of September 2010. The Technical Committees selected 369 individual papers from among these.

The General Secretariat developed on-line applications that enabled the authors of papers and the Technical Committees to carry out the entire process of evaluating and managing papers via the Internet.

XXVth World Road Congress (Seoul, 2-6 November 2015)

The Council in Budapest (20-22 October 2010) selected the application from Seoul (Republic of Korea) to organize the XXVth World Road Congress. It will take place from 2 to 6 November 2015.

3.3.2. World Road Association’s Winter Road Congress

XIIIth International Winter Road Congress (Quebec City, 8-11 February 2010)

The XIIIth International Winter Road Congress was held in Quebec City (Canada-Québec) from 8 to 11 February 2010.

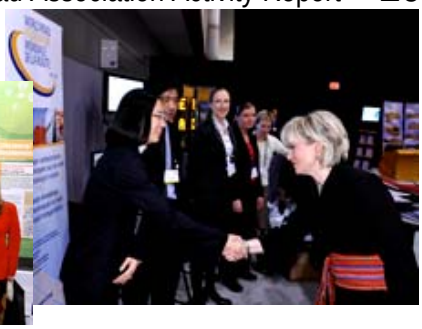
The general theme of the Congress was: *Sustainable Winter Service for Road Users*, and both it and its accompanying exhibition were a success, attracting some 1,500 participants from 55countries. 111 papers were given during 30 sessions that covered 6 themes.

In a plenary session, Ministers from 6 member governments spoke on “*How to promote winter mobility adapted to the climate?”*, and mayors of some large cities described their approach to the *Economic and financial governance of winter service.*

The first international snowplough championship was held during the Congress and attracted 20 participants from 9 countries. The winner was Ryan Campbell (USA).

The general report was published in issue 346 of Routes/Roads.





The CD-ROM of the final version of the Congress proceedings which was prepared by the Québec organizing Committee became available at the end of 2010.

XIVth International Winter Road Congress (Andorra, 4-7 February 2014)

In 2009, the Council accepted Andorra's application to organize the XIVth International Winter Road Congress.

The first meetings between Technical Committee B5 and the General Secretariat with a view to organizing this Congress have been held.

3.3.3. Symposium SURF 2008

In 2008, the 6th International Symposium on pavement surface characteristics for roads and airfields, SURF2008, was held in Portoroz (Slovenia) as the result of collaboration between Technical Committee D2 and the Slovenian National Committee.

The topics covered at the SURF 2008 symposium reflected the most recent technological advances in pavement surface appraisal techniques and provided a picture of current knowledge about vehicle/pavement interactions.

The 7th SURF symposium will be held in Norfolk, VA, in the United States in September 2012 and will be organized by the World Road Association with FHWA, AASHTO and Virginia Tech University.

3.4. Projects

3.4.1. International Seminars Programme

To gain a better understanding of the needs of developing and transition countries and to encourage exchanges and knowledge transfer that involve a larger number of participants from these countries, the Council of the World Road Association confirmed that the 2008-2011 cycle would include a programme of regional international seminars. The aim was for each Technical Committee to take part in the organization of 2 seminars.

Nine Technical Committees and sub-committee D2c achieved this, and three others very nearly did, having organized 1 seminar and one workshop in the course of the cycle. The other four Committees and the two sub-committees D2a and D2b only took part in one seminar. It should however be noted that the 3 sub-committees in D2, in particular D2a, drew up the technical programme for the SURF2008 symposium which was organized with the Slovenian National Committee in October 2008. In most

cases, the planned seminar was cancelled due to difficulties encountered by the intended host country and scheduling another event proved to be impossible.

In all, ***26 seminars were organized in 19 countries. The involvement of the 17 Technical Committees*** is shown in the Table below:

TECHNICAL COMMITTEE	TOPIC OF THE SEMINAR	HOST COUNTRY	DATES
A.1	Environment and sustainable transport Seminar jointly organized with TC B4	Timişoara (Romania)	16-18 September 2009
A.1	Reducing the carbon footprint in road construction	New Delhi (India)	17-19 February 2011
A.2	Technical Management and Financing of Road Maintenance	Ouagadougou (Burkina Faso)	2-3 December 2008
A.2	Workshop: financing of Road Infrastructures	Rabat (Morocco)	14 April 2009
A.2	Workshop: Public-Private Partnerships in the Road Sector	Osaka (Japan)	13-14 October 2009
A.3	Road-toll policies applied or planned in Central and Eastern European Countries	Budapest (Hungary)	6-7 May 2009
A.4	Sustainable maintenance of rural roads	Hyderabad (India)	21-23 January 2010
A.4	Sustainability of rural road networks	Santa Cruz de la Sierra (Bolivia)	9-11 March 2011
B.1	Management of human resources, governance and contracting	Bamako (Mali)	8-10 December 2009
B.1	Customer oriented approach; seminar jointly organized with B2	Malaysia	25-27 April 2011
B.2	Workshop: E transport conference and exhibition	Johannesburg (South Africa)	26 March 2009
B.2	Customer oriented approach; seminar jointly organized with B1	Malaysia	25-27 April 2011
B.3	Workshop: Improved mobility in urban areas	Seoul (Rep. of Korea)	19 March 2009
B.3	Improved Mobility in Urban Areas and Freight Transport and Inter Modality; seminar jointly organized with B 4	Santiago (Chile)	13-14 April 2011
B.4	Environment and sustainable transport Seminar jointly organized with TC A1	Timişoara (Romania)	16-18 September 2009
B.4	Improved Mobility in Urban Areas and Freight Transport and Inter Modality; seminar jointly organized with B 3	Santiago de Chile (Chile)	13-14 April 2011
B.5	Technical Solutions for Sustainable Winter Service	Hradec-Králové (Czech Republic)	7-9 October 2009
B.5	Management of winter services in an extreme continental climate country	Oulan Bator (Mongolia)	6-8 April 2011
C.1	Workshop: Safer road infrastructure and operation jointly organized with TC C2	Kuala Lumpur (Malaysia)	22 October 2008

C.1	Promoting Road Safety for Vulnerable Road Users; seminar jointly organized with C2	Cape Town (South-Africa)	25-27 October 2009
C1	National road development strategies and road safety on improved highways	New Delhi (India)	14-19 March 2011
C.2	Workshop: Safer road infrastructure and operation; jointly organized with TC C1	Kuala Lumpur (Malaysia)	22 October 2008
C.2	Promoting Road Safety for Vulnerable Road Users; seminar jointly organized withC1	Cape Town (South-Africa)	25-27 October 2009
C.2	Safer Road Operations	San José (Costa Rica)	10-12 November 2010
C2	Latest developments in concrete pavements design and building/ Influence of infrastructure on road safety management; jointly organized with TC D2c	Buenos-Aires (Argentina)	9-10 May 2011
C.3	Managing Risk in Road Operations	Iasi (Romania)	5-7 November 2009
C.3	Risk and emergency management	Beijing (China)	9-12 November 2010
C.4	Tunnels and ITS Applications	Buenos Aires (Argentina)	24-26 March 2010
C4	Sub-sea Tunnels	Xiamen (China)	25-26 March 2011
D.1	Road asset management	Swakopmund (Namibia)	4-6 April 2011
D.2 a	Maintenance Techniques to Improve Pavement Performance; jointly organized with TC D2b	Cancún (Mexico)	24-26 August 2009
D.2 b	Maintenance Techniques to Improve Pavement Performance; jointly organized with TC D2a	Cancún (Mexico)	24-26 August 2009
D2.c	Workshop Pavement	Seoul (Korea)	6-8 October 2009
D2.c	Latest developments in concrete pavements design and building/ Influence of infrastructure on road safety management; jointly organized with TC C2	Buenos Aires (Argentina)	9-10 May 2011
D.3	Concrete Bridges	Changshu (China)	22-23 October 2009
D.4	Geotechnics and Unpaved Roads	Cotonou (Benin)	28-30 October 2009

A.1 = technical committees which have organized 2 seminars (or 1 seminar and 2 workshops)
workshop: one-day workshop

3.4.2. The World Road Association/ HDM-4 project

In 1996, the World Road Association Executive Committee first suggested the role that the World Road Association could play when taking over the management of the HDM-4 Project (software for development studies and the technico-economic management of road networks). After two years of development from 1998 to 2000, Version 1.0 was made available in March 2000 in English, French and Russian. In 2002 after surveys made in the Member Countries with decision-makers, then with users, the Council adopted a resolution to develop a new version (version 2) to be developed by the University of Birmingham under the supervision of the General Secretariat.

So as to comply with the request of the Council to ultimately outsource the management of the project, after an international call for tender a concession contract was signed in August 2005 for a five-year-term with HDM Global. The concessionaire is responsible for promotion, sales and help to users as well as managing the evolution of the software (see dedicated site: http://www.hdmglobal.com/).

The very positive results of the concessionaire's action in terms of licence sales (779 licences) as well as assistance to users led to the renewal of the concession with HDM Global for another five-year-period.

In partnership with the Mexican Institute for Transports (Instituto Mexicano del Transporte, IMT), a Spanish version of the software has been produced. The translation in Spanish of the user's manuals is planned.

3.5. Cooperative Activities

Goal 2 of the World Road Association's Strategic Plan is to promote cooperation with other international and regional organizations which share similar aims to the World Road Association.

Cooperation involves exchanging information, coordinating work programmes to avoid redundancy and sharing resources to ensure the success of studies, congresses and international seminars.

A large number of international organizations and associations have representatives on the World Road Association's committees which correspond to their activities. Without attempting to create a full list, we can mention the European Commission, the joint ECMT-OECD transport research centre, the United Nations (the ILO-ASIST programme), the World Bank, the IRF, FISITA, Eurobitume, Cembureau, the International Tunnelling Association (ITA), etc.

During the period in question, we have relied very much on regional organizations of roads administrations to pursue our goals and formalize relations with other organizations by means of framework agreements.

3.5.1. Cooperation with regional organizations of road administrations

During this period, several memorandums of understanding with regional organizations have been drawn up or updated with a view to strengthening synergies of action.

A memorandum of understanding was signed in 2009 in Seoul with REAAA along the lines of that signed with the CEDR in order to institute cooperation between the two organizations.

The General Secretariat has regularly taken part in the meetings of the Council of Iberian and South American Road Directors (DIRCAIBEA), and a new memorandum of understanding accompanied by an action plan to promote the World Road Association's activities with regard to Latin American countries and increase their participation has been prepared and will be presented in Mexico City.

A new memorandum of understanding, with the Nordic Road Association (NRA) was prepared by the General Secretariat and signed in 2010. This updates the previous agreement and confirms NRA's commitment to making a technical advisor available to the General Secretariat.

3.5.2. Cooperation with other organizations

The General Secretariat has continued to entertain regular contacts with the organization for Economic Cooperation and Development (OECD), the World Bank and the Transport Research Board (TRB), in order to exchange information on on-going work and projects.

Following the President's participation in the first Global Ministerial Conference on Road Safety that was held in Moscow on 19 and 20 November 2009, and in discussions with the World Health Organization, the Association has confirmed its involvement in the United Nations' Road Safety Collaboration (UNRSC) in order to make a more effective contribution to the United Nations' decade of action in this area.

A joint working group has been set up between the World Road Association and the ITA (International Tunnelling and Underground Space Association)on tunnel safety issues (COSUF).
Following the signing of a memorandum of understanding with FISITA (International Federation of Automotive Engineering Societies) in 2007, a joint working group on vehicle-infrastructure cooperative systems was set up under the aegis of Technical Committee B2.

A memorandum of understanding was signed in May 2010 between the Secretary General and the Indian Roads Congress (IRC) with a view to strengthening ties with India. IRC is now officially recognized as acting as an Indian National Committee. This agreement has already had a practical outcome in the form of two international seminars which were held in Delhi in 2011.

4. FEEDBACK ON THE 2008-2011 STRATEGIC PLAN

As mentioned in paragraph 2.2.2, the 2008-2011 Strategic Plan had set a number of organizational goals to assist PIARC in fulfilling its mission. It is interesting to note what could be achieved in respect of each of the goals.

Goal 1: To continuously improve the management and operation of the World Road Association in order to provide members with a service that represents good value for money.

The review carried out by the Strategic Planning Commission, reflected in the document "Improving quality and processes" resulted in a set of recommendations on the role of Strategic Theme Coordinators and Technical Advisors, the quality processes to be implemented by Technical Committees, etc.

The nomination of Theme Coordinators, Chairs and Secretaries of Technical Committees has been brought forward to allow better continuity from one cycle to another and to speed up the start of the new cycle.

The website of the Association has been restructured taking into consideration the comments received through the user survey, with the aim to improve its ergonomics.

Conference debates are held at all meetings of the Council and the Executive Committee to foster exchanges.

Goal 2: Promote cooperation with regional organizations of road authorities and with other international organizations with related goals.

Relationship with different regional organizations has been consolidated. In particular, a memorandum of agreement was signed with REAAA in 2009; the agreement with the Nordic Road Association was renewed; and a new MoU was signed with DIRCAIBEA.

Goal 3: To develop and encourage professionally worthwhile and effective personal contact networks.

This goal, assigned to the General Secretariat, is related to Goal 2. It refers to the regular contacts maintained with the various regional organizations.

Goal 4: To host major congresses that are valuable events for setting direction for the future, provide knowledge exchange and networking opportunities among members of the road transport community, and develop a range of options that are viable from the World Road Association's point of view.

The XXIIIrd World Road Congress held in Paris in September 2007, marking the centenary of the Association, was a huge success, both in terms of attendance—more than 5500 participants in the Congress and Exhibition; sixty countries represented at the ministers' session—and in terms of assessment of the event as shown by the survey of congress delegates that reflected their satisfaction.

The XIIIth International Winter Road Congress in Quebec City in February 2010, the first to take place in North America, was also a great success in terms of attendance, the quality of presentations and the organization of the first snowplough championship.

These two Congresses, and the financial arrangements adopted for the upcoming congresses, ensure to the Association a level of income enabling to contribute to the funding of the Association projects.

The Council chose by vote Seoul (South Korea) as the venue for the XXVth World Road Congress in 2015 and Andorra for the XIVth International Winter Congress in 2014. These choices will ensure an optimal geographical distribution of the location of events, which is key to the visibility of the actions of the Association in the various parts of the world.

Goal 5: To build and strengthen the activity and visibility of the Association at the national level.

The dynamics of exchanges and communication among National Committees which started during the previous cycle, has continued over this cycle.

A new partnership strategy has been adopted, to recognize an existing organization acting as a National Committee. This initiative aims to give a new impulse to the Association's influence at national level and has been well received in a number of countries. The result is the expected signature, on the occasion of the Mexico Congress, of MoUs recognizing new National Committees in Argentina, the United States and Uruguay.

Goal 6: To develop practical means for efficient and effective knowledge transfer among countries.

The principles of a knowledge transfer policy have been developed and adopted. However, several difficulties were experienced for the implementation of an action plan. This will be overcome by setting up a specific working group in the coming years.

A new operation approach at regional level has been developed for several Technical Committees and will be implemented during the 2012-2015 cycle. This should allow increased participation of developing countries in the activities of the Association and improved distribution of the results of the work of the Association in those countries.

Goal 7: To improve participation of member governments and to increase the number of members of the road community benefiting, whether through National Committees or by direct participation, in the World Road Association Technical Committees.

The number of members and corresponding members appointed to Technical Committees by member countries is clearly increasing (1200 approximately, compared to 1000 during the two previous cycles). However, the number of active and regular participants has not increased in the same way.

The budget restrictions introduced in many countries following the global financial crisis in 2008 have significantly impacted the possibility for many members to travel and attend meetings and seminars. This had also a significant impact on the smooth operation of Technical Committees.

The trial of regional groups described above is one of the responses envisaged to increase the level of participation.

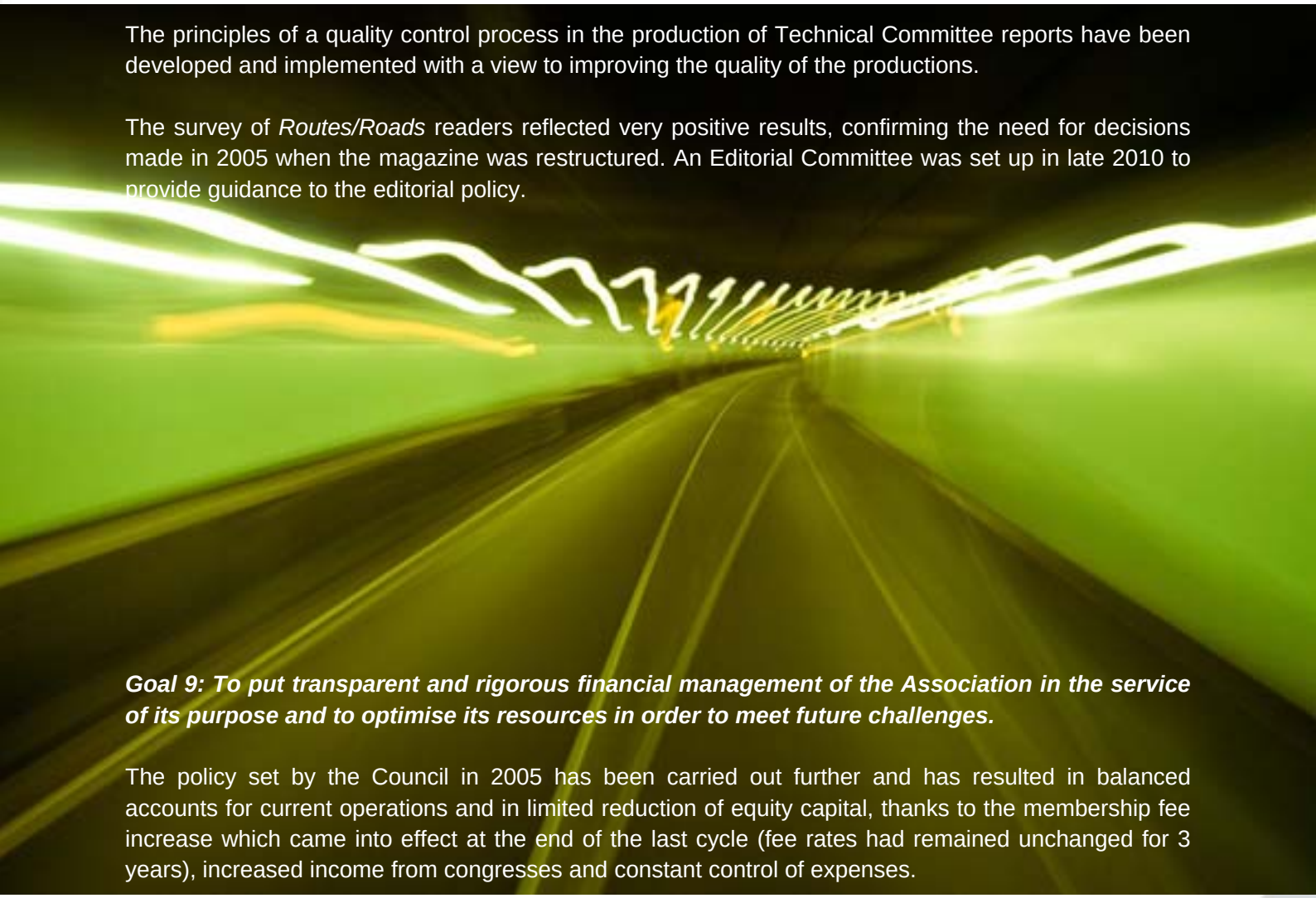
Goal 8: To produce and disseminate authoritative, impartial and interesting publications and products that address road and road transport issues.

The number of users of the Virtual Library in the website of the Association reflects the high level of interest of the Association's publications, available free of charge to the public.

The organization of knowledge in electronic form on the website, which had started during the previous cycle with the *Road Network Operations Manual*, was further carried out with the *Tunnels Manual* and the *Intelligent Transport Systems Manual*, which will be introduced at the Congress in Mexico City. These initiatives, combined with the restructuring of the website, prefigure new ways to present work results through the website.

The principles of a quality control process in the production of Technical Committee reports have been developed and implemented with a view to improving the quality of the productions.

The survey of *Routes/Roads* readers reflected very positive results, confirming the need for decisions made in 2005 when the magazine was restructured. An Editorial Committee was set up in late 2010 to provide guidance to the editorial policy.



Goal 9: To put transparent and rigorous financial management of the Association in the service of its purpose and to optimise its resources in order to meet future challenges.

The policy set by the Council in 2005 has been carried out further and has resulted in balanced accounts for current operations and in limited reduction of equity capital, thanks to the membership fee increase which came into effect at the end of the last cycle (fee rates had remained unchanged for 3 years), increased income from congresses and constant control of expenses.

Goal 10: To identify, develop and promulgate policy and practices that contribute to safer and more effective management and use of road and road transport systems within an integrated sustainable transport context.

This refers to the work carried out by the Strategic Planning Commission, including in particular the draft Strategic Plan 2012-2015 which will be submitted to the Council meeting in September 2011 in Mexico City.

5. PROSPECTS

Adjustments to Strategic Directions

In September 2011 in Mexico City, the Strategic Plan for the 2012-2015 period will be submitted to the Council. The directions set in the Strategic Plan reflect the priorities expressed by member countries and show the importance of a number of subjects, including:

- Reduction of the transport sector impact on climate change and adaptation measures,
- Road safety; the Association's work will focus on the UN Decade of Action for Road Safety,
- Integration of road administrations with those of other modes,
- Optimizing the use of existing infrastructure;
- Reduction of carbon footprint in the construction and operation of road infrastructure.

Innovations in work methods

In the course of the coming work cycle, several Technical Committees organized at a regional level will be trialled in order to obtain an increased participation in the work of the Association from countries in certain regions of the world (Latin America, Africa, and Asia).

Due to budget and travel restrictions in many countries, the Association will aim to increase the use of electronic means of communication (teleconference via Internet), including meetings of the Executive Committee, Commissions and working groups of Technical Committees.

In order to cover certain topics within a short period of time, task forces will be set up, e.g. for the revision of the Road Safety Manual or to study issues related to security of infrastructure.

A clear communications and marketing policy

A comprehensive communications and marketing plan was developed by the Communications and International Relations Commission. It describes the key issues and actions that will be updated according to a rolling multi-annual programme.

Emphasis will be set on the production of several flagship publications such as the Road Safety Manual, the Road Tunnel Manual, the Intelligent Transport Systems Manual and the Road Network Operations Manual, etc. The objective is to create international reference documents that are widely recognized and therefore strengthen the profile and image of the Association.

The reorganization of productions and knowledge within the website will be continued according to the various topic areas.

A specific action programme will be implemented to draw interest and increase participation of young professionals in the activities of the Association.

DETAILED ACTIVITY REPORTS OF TECHNICAL COMMITTEES

COMMITTEE CTERM - TERMINOLOGY

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Members:

René Gemme, Canada
Annelies Glander, Austria
Ada Lia Gonzalez, Argentina
Cristina Higuera Toledano, Spain
Hans Walter Horz, Germany
Alain Jacot, Switzerland
Petr Komarek, Czech Republic
Martin Lamb, United Kingdom
Bernard Lombardi, France
Marie Pastol, France
Mohsen Rahimi, Iran
Balazs Sziranyi, Hungary
Daniël Verfaillie, Belgium

Corresponding members:

Ana Cristina Freire, Portugal
Mahsa Mehrpouya, Iran
Ariadna Nicoara, Romania

Terminology correspondents in, or other members (as stated in brackets) of, technical committees:

Anne Beeldens, Belgium (TC D.2c)
Henri Chua, United Kingdom (TC A.2 – Chairman)
Bernard Dethy, Belgium (TC D.4)
Jon Douglas, Australia (TC C.1 – English-speaking Secretary)
Lise Filion, Canada (TC B.2)
Lise Fournier, Canada (TC C.1 – French-speaking Secretary)
Luc-Amaury George, France (TC D.2a – Member)
Pierre Gilles, Belgium (TC D.3 – Member)
Andras Gulyas, Hungary (TC D.2b)
Dora Hunyadi, Hungary (TC A.1)
Manuel Romana Ruiz, Spain (TC C.4)
Hanne Samstad, Norway (TC A.3)
Pierre Schmitz, Belgium (TC C.4 – Chairman)
Lise Tourigny, Canada (TC C.2)
Hans-Joachim Vollpracht, Germany (TC C.1 – Chairman)

1. ACTIVITIES AND ORGANIZATION OF CTERM BETWEEN 2008 AND 2011

The Committee had six plenary meetings:

- Paris (France), April 8-9, 2008;
- Budapest (Hungary), October 9-10, 2008;
- Vienna (Austria), June 18-19, 2009;
- Quebec (Canada), February 8-9, 2010;
- Prague (Czech Republic), September 28-29, 2010;
- Zurich (Switzerland), March 28-29, 2011.

1.1 The tools

1.1.1 Hard-copy terminology documents

PIARC has two home-made terminology documents:

- The PIARC Technical Dictionary of Road Terms was first published in 1931. It has been the subject of eight hard-copy editions since that time; the eighth edition was released in five languages (French, English, German, Spanish, and Portuguese) at the previous World Road Congress in Paris (in 2007). For more than thirty years, the Dictionary has been published in English and in French (the basic version in the two official languages of the Association) and translated into many other languages.
  The Dictionary basically includes specific road terms validated by the competent PIARC technical committees within their respective fields of expertise and, consequently, officially endorsed by PIARC. Its object is to establish a one-to-one link between French and English terms expressing the same concepts, thereby facilitating translations into other languages. The eighth edition contains 1,684 concepts, with definitions for approximately half of these.
- The PIARC Lexicon of Road and Traffic Engineering was first published in 1991. A second hard-copy edition was released in 2000 (now out of print).
  The object of the Lexicon is to help French or English-speaking readers to translate technical documents on roads and road operation. The second edition contains over 16,000 terms in English and French in common usage by road engineers, including – unlike the Dictionary – terms used in related fields such as environment, land use, geography, mathematics and statistics, etc.

1.1.2 Soft-copy Terminology database

In 2003, appropriate Internet software was developed for a PIARC Terminology database that can be consulted on-line and allows easy addition, amendment and deletion of terms, definitions and illustrations.

In addition to the Dictionary and Lexicon described above, this database contains a number of “specific dictionaries” in the areas of road transport informatics (ITS), sustainable transport, bridges, weigh-in-motion, and winter maintenance – all of these in the basic languages (French and English) and any other language into which they have been translated.

Each of the terminology documents (“dictionaries”) accessible with the software can be extended with translations into other languages, and new documents can be added. In this way, an on-line electronic database is built that can be updated and upgraded any time.

The PIARC Terminology database is intended for three levels of use:

- a user can consult a dictionary – or several at the same time – for a given term; the result of the search can be displayed in up to three languages at a time;
- an editor has the additional option to make proposals for additions and amendments. These include new terms, new definitions, a new language for a given dictionary, or even a new dictionary;
- finally, the administrator, representing PIARC as the owner of the copyright of the Terminology database, validates or rejects additions and amendments directly on-line.

Since November 2006 (approval of the PIARC Council), access to the PIARC Terminology database has been free for all users, leaving only editors and the administrator needing a login and a password to be given by the PIARC General Secretariat.

The PIARC Terminology database as a working tool was presented by Balazs Sziranyi to the PIARC Council during a meeting in Incheon (Republic of Korea) in September 2009.

1.2 Work programme

1.2.1. General objectives

A common terminology that is understood by road professionals all over the world is instrumental in promoting technology transfer especially in developing countries, countries in transition and rural and remote areas.

In this context, the PIARC Strategic Plan developed for the inter-congress period 2008-2011 defined the following issue, strategies and objectives for CTERM:

- issue: updating the PIARC Terminology database;
- strategies:
    - ensure active support from the network of correspondents from other technical committees and national committees of PIARC;
    - upgrade the software of multilingual dictionaries on the Internet;
    - promote the inclusion of specialized glossaries in PIARC publications (cf. § 3.9 in Appendix B1 (2006) to Section 8 of the PIARC “Blue Guide”);
    - promote the further elaboration of PIARC terminology in languages other than English and French;
- objectives:
    - permanent updating of the dictionaries in the Terminology database;
    - presentation of the database at national events;
    - short article(s) (one page) in Routes/Roads to report on work in progress for the PIARC Terminology database;
    - presentation of the database at national events;
    - presence of CTERM at the Congress, in a form to be defined.

1.2.2. Organization of work

The updating and translation process for the PIARC Terminology database works mainly through editors, who may choose to work either on-line (using a login and password received from the PIARC General Secretariat) or off-line (on files in Excel format exported by the administrator of the database in the appropriate presentation in columns corresponding to the specific data fields).

There are several types of editor:

- for the basic (French and English) versions of the Dictionary and Lexicon, terminology correspondents are appointed in each technical committee of PIARC. It is their task to collect terminology proposals from their committees within their specific fields of competence;
- for translations into other languages than French and English, corresponding members are appointed within CTERM by the various national committees of PIARC. They have full authority and responsibility for their translations;
- finally, the members of CTERM themselves are entitled to make proposals for French and English and may be authorized by their national committees to prepare translations into their respective languages as well.

Per strategic theme (ST) selected by PIARC for the current inter-congress period, one member of CTERM communicates as a liaison agent with the terminology correspondents of the technical committees working under that theme, to encourage them in their task and to facilitate the exchange of terminology data between CTERM and the committees. In the period 2008-2011, the liaison agents were:

- Martin Lamb for the committees under ST A “Sustainability of the Road Transport System”;
- Balazs Sziranyi for the committees under ST B “Improving Provision of Services”;
- Christina Higuera Toledano for the committees under ST C “Safety of the Road System”;
- Annelies Glander for the committees under ST D “Quality of Road Infrastructure”.

After preliminary checking and commenting, the liaison agents forward the contributions received to the working group leader within CTERM (Daniël Verfaillie in 2008-2011).

This working group leader checks all the proposals to avoid any redundancies or duplications and converts them into a columned format while adding a suggestion for inclusion in the Dictionary and Lexicon, inclusion in the Lexicon only, or rejection. He then circulates the list to all the members of CTERM for comments. After processing their comments, he prepares a discussion in the CTERM plenary meeting only for the terms whose difficulties could not be solved by e-mail. The list as approved by CTERM after discussion is returned to the relevant technical committee for final comments and validation.

In the end, the validated terms and definitions are put on-line by the administrator of the database.

Translations into other languages need not be checked and discussed in CTERM, as the corresponding members and their national committees are deemed to be competent for terminology in their own languages.

The fact that contributions and translations may be received and/or approved at any time between two PIARC congresses makes the updating and translating of the PIARC Terminology database a continuous process.

1.3 Current state of progress

A presentation of the Terminology database, with details on updating and developments since 2005 and a call upon users to contribute, was published in Routes/Roads No. 346.

1.3.1. Updating

In September 2008, a letter was sent to the chairs of the various technical committees of PIARC, explaining what CTERM was expecting from each terminology correspondent (see Section 1.2.2):

- mainly: to deal with the English and French versions of the chapters and subchapters of the PIARC Dictionary and Lexicon and – where applicable – with the "specific" dictionaries (see section 1.1.2) most appropriate to the expertise of his/her technical committee, by making proposals for:
    - the addition of new concepts (preferably with definitions) arising in the work of his/her committee;
    - the revision of concepts already existing in these chapters and subchapters and in these specific dictionaries;
    - the addition of illustrations to both new and existing concepts, provided they are free of copyright and/or permission for reproduction can be obtained;
- additionally, to identify within his/her committee those members who are also involved in ISO and/or CEN standardization, in order to collect information on terminology work done in ISO and CEN committees that may be useful to PIARC.

After editing and discussion in CTERM, the short glossary of terms and definitions in the field of growth and development of recycling in pavement construction prepared by the former (2004-2007) TC 4.3 on Road Pavements was put on-line in February 2009.

During the period between the Paris and the Mexico Congresses, eight technical committees actually provided CTERM with proposals for discussion and validation:

- TC A.1 on Preserving the Environment, Performance of Road Administrations.
  After reviewing in CTERM and submission to the TC for final commenting and approval, the proposals were put on-line in February 2011;
- TC A.2 on Financing, Managing and Contracting.
  After reviewing in CTERM and final commenting and approval by the TC, definitions for "funding" and "financing" were put on-line in December 2009;
- TC A.3 on Road System Economics.
  After reviewing in CTERM and final approval by the TC, the proposals were put on-line in March 2011;
- TC B.2 on Road Network Operations.
  At the CTERM meeting in Quebec, in view of the availability of several recent "source" documents in the field of intelligent transport systems, the task for terminology correspondent Lise Filion as described in the letter of September 2008 (see above) was redefined as follows:
    - to go through the Trilingual Vocabulary of Intelligent Transportation Systems (English, French and Spanish) prepared by the Office québécois de la langue française (OQLF) while taking into account documents on the ITS architecture in the United States along with documents published by PIARC, and annotate the terms and definitions with "D+" (to be included in the PIARC Dictionary, with a definition), "D" (to be included in the PIARC Dictionary, without definition), "L" (to be included in the PIARC Lexicon, without definition) or "R" (to be rejected), bearing in mind that any term added to the Dictionary must also appear in the Lexicon. At the time of drafting this report, Mrs Filion's list is still open for comments by the members and corresponding members;
    - to use the same OQLF Vocabulary as a reference document for commenting on the draft revision of the English version of the PIARC Dictionary on Road Transport Informatics circulated by the Nordic Road Association (NVF) (see below);

- TC C.1 on Safer Road Infrastructure.
  After final commenting and approval by the TC, a definition of the concept “forgiving road” was put on-line in August 2009;
- TC C.4 on Road Tunnel Operations.
  The TC prepared a whole new specific dictionary with 147 terms in the area of road tunnel operation. See Section 1.3.2.2 for more details;
- TC D.2c on Concrete Pavements.
  After reviewing in CTERM and submission to the TC for final commenting and approval, the terms and definitions extracted from Section 2 of CEN standard 1338 “Concrete paving blocks – Requirements and test methods” as suggested by terminology correspondent Anne Beeldens were put on-line in February 2011;
- TC D.4 Geotechnics and Unpaved Roads.
  The TC’s proposals for a definition of “local material” and a new definition of “marginal material” were put on-line in September 2010 and April 2011, respectively.

Both TC C.4 on Road Tunnel Operations and TC D.3 on Road Bridges agreed to CTERM’s proposal that the title of Chapter 12 “Engineering structures” of the PIARC Dictionary be replaced by “Structures”.

Additionally, Annelies Glander provided CTERM with two lists of German terms for which she had not been able to find English and/or French equivalents in the PIARC Dictionary or Lexicon:

- for the first list, with terms extracted from a text of the Austrian highways authority, English and French equivalents suggested by CTERM after discussion in Quebec and commented on by TCs C.4 on Road Tunnel Operations, D.2a on Road Surface Characteristics, D.2b on Flexible and Semi-rigid Pavements and D.4 on Geotechnics and Unpaved Roads, were put on-line in February 2011. A late reply announcing further comments was received from TC C.2 on Safer Road Operations in May 2011;
- for the second list, with terms extracted from an official document on motorcyclist safety, English and French equivalents were discussed in Prague and in Zurich. At the time of drafting this report, the document as discussed is open for further comments by CTERM members and corresponding members before circulation to the various competent TCs of PIARC for comments and approval.

Furthermore, Annelies Glander replied in December 2010 to a request by Arndt Schwab (Germany) for English and French translations of a list of German terms in the subject area of traffic calming. This list could be examined in the same way as the previous two, probably in the next inter-congress period.

Finally, the Nordic Road Association (NVF) is preparing a new version of the specific Dictionary on Road Transport Informatics (ITS) available in the PIARC Terminology database since 2005. In March 2011, this revision was, in principle, finished regarding the English basis and three out of four Nordic languages. A proofreading of the English database for grammar and wording of definitions was being carried out, as well as a thorough check of the cross references. Charlotte Von Scholten (Denmark), who coordinated phase 1 of the project, hoped that the database would be complete before summer. She gratefully acknowledged the detailed comments by Lise Filion (see above), many of which had been taken into consideration in the review of words and definitions. In comparison with the first edition, the number of entries is almost doubled.

Phase 2 of the project has been initiated. This phase includes a detailed plan for the implementation of the terminology as well as a plan for future maintenance, etc. NVF hopes to conclude it in the autumn of 2011. Phase 2 is to be coordinated by Peter Yde from the company COWI.

1.3.2. Upgrading

1.3.2.1 Software

The “user” and “editor” help files, both in English and in French, were adapted to the new layouts of the screens developed by the software company. The texts had to be slightly changed, and arrows, boxes, etc. required moving. The new files were uploaded in October 2009.

The navigation screens for the “user” part of the software were translated into Spanish in the light of the Congress in Mexico. A similar effort could be undertaken for other languages as well. After its meeting in Zurich, CTERM made the following general proposal to the PIARC General Secretariat for translating the navigation screens into other languages than English and French:

- interested national committees to fund and provide the translations into their languages;
- PIARC to arrange – also financially – with the software company to have these translations put on-line;
- rather than having flags in the top right-hand corner of the homepage, a rolling menu could be provided from which to select the appropriate language.

It would be useful to extend this translation effort to the “user” help file.

When translating a dictionary into another language, the translator is now able to see both English and French, which makes it possible to double-check his/her translation.

The possibility to hover the mouse over the names of specific dictionaries to see the dictionary characteristics (such as numbers of concepts and languages available) was restored.

Language “slots” were opened for on-line translations:

- of the PIARC Dictionary into Czech and Romanian;
- of the PIARC Lexicon into German, so as to enable Annelies Glander to enter German terms from the list discussed in Quebec and the list of motorcyclist terms discussed in Prague and in Zurich (see Section 1.3.1)
- of the new specific dictionary on road tunnel operation (see section 1.3.3.2) into Korean.

Other developments suggested by CTERM to the PIARC General Secretariat:

- a “remember password” option when logging in as an editor;
- a study by the software company into the feasibility and cost of an additional development of the software for a terminology correspondent who is not a member of PIARC to be added to the “Users list” in the “administration” part of the database (with a view to giving him/her editing rights); and
- the possibility to establish links between a term used in a definition and defined elsewhere in the same dictionary or in the database (“interlinkability”)

are on hold awaiting a complete revision of the public and members’ areas of the PIARC website by the Congress in Mexico.

1.3.2.2 Dictionaries

Truncated definitions in the specific dictionary on weigh-in-motion (due to a problem with the upload of the document) were restored, and synonymy was revised.

As stated in Section 1.3.1, TC C.4 prepared a whole new “specific” dictionary with 147 terms and definitions in their subject area, both in English and in French. This list was compiled from existing terms and definitions available in the PIARC Dictionary (Chapter 15 “Tunnels”) and the PIARC Lexicon (Chapter 6 “Bridges – Tunnels”), while adding some terms and definitions extracted from the glossaries of technical reports produced by the Committee. Comments by CTERM members were sent to the Chairman of CT C.4 (Pierre Schmitz) in April 2011.

TC C.4 is also providing for a translation of this new dictionary in as many languages as available within the TC. Members and associate members of TC C.4 were appointed as contact persons for that purpose. In principle, it is up to these contact persons to provide the translations and to CTERM members and corresponding members to comment, both in their respective languages.

In the next inter-congress term, CTERM would like to see a similar effort undertaken by the TC on bridges for the compilation of a specific PIARC dictionary on bridges, with terms and definitions that are now scattered all over the database (Chapter 12 of the PIARC Dictionary, Chapter 6 of the PIARC Lexicon, the Bridges dictionary of NVF, and the SWECO dictionary on bridges). A valuable input could be obtained from Sylvie Proeschel (former member of CTERM), who has a large database on bridges that could be shared subject to copyright owned by IFSTTAR (France).

Whereas abbreviations of technical concepts (such as BLEVE) are in the database – in brackets behind the full term – acronyms of organizations are missing. After a discussion on the potential for an additional dictionary on acronyms or an additional chapter on acronyms in one of the dictionaries, and after consultation with the PIARC General Secretariat, CTERM felt that:

- acronyms could be added as a new theme 17 in the PIARC Dictionary, to allow for it to be translated in as many languages as possible (which would not be the case if it was added as a new theme 26 in the PIARC Lexicon);
- the organizations included should be either international or national but internationally active, and related specifically to roads.

The list of acronyms appended to the first hard-copy edition of the Lexicon (1991) was circulated to the members and corresponding members for “yes/no” annotation and possibly suggestions for organizations not present. The results will be complemented by the organizations listed under the “Links” tab (except the “Road Administrations”) on the homepage of the PIARC website.

Another development considered for the future relates to systematic use of ISO standards in presenting PIARC terminology:

- ISO 10241 and ISO 704 for terms and definitions:
    - terms: lowercase, basic grammatical form (e.g., noun in singular), etc.;
    - definitions: same grammatical form as the term, not to start with an article, single phrase with examples and further details referred to notes, substitution principle, etc.;
- ISO 3166-1 for country codes used in “attributes of origin” for national variants of standard terms, e.g., AT for Austria rather than A, BE for Belgium rather than B, and US for the United States rather than USA.

1.3.3. Translations into other languages

A review of work done by CTERM members and corresponding members on, or contacts made by CTERM for, translations of dictionaries contained in the Terminology database into other languages than English and French is presented below.

Such translations will always be one step behind, as new English and French terms are continuously added. However, once a translation has been completed to 100% a good practice for the country concerned would be to nominate someone to periodically review English or French revisions and thus maintain the standard of the dictionary with comparatively little effort.

1.3.3.1 Arabic

Unlike e.g. for Dutch, where the reference would be the Netherlands, or Latin American Spanish, where the reference would be Spain, there is no such country for Arabic. Moroccan Arabic is different from that in the Middle East. The Arabic translation of the PIARC Dictionary as available in the existing hard copy editions is not up to the standard required.

A partial translation (of a higher standard) of the PIARC Dictionary into Arabic as compiled by Moroccan delegates to PIARC was put on-line in the database in June 2009 and sent to the Saudi Arabian member of CTERM for comments and completion. In spite of repeated contacts with the Saudi Arabian First Delegate and reminders to the member concerned, no reply was ever received.

1.3.3.2 Croatian

In spite of reported interest in a Croatian translation of the ITS Dictionary, there has been no response to the two letters sent to Professor Mario Anzek of the Technical University of Zagreb.

In February 2009, professor Mate Sršen of the University of Rijeka showed an interest in completing the Croatian translation of the PIARC Dictionary. Contacts were made with the PIARC General Secretariat to have his name added to the "Users list" in the "Administration" section of the PIARC Terminology database, with a view to giving him the necessary editing rights for the Croatian language.

1.3.3.3 Czech

A Czech translation (dating from 1996) of the 6th edition of the PIARC Dictionary was turned into an electronic copy to serve as a basis for compiling a new Czech translation on-line. To complete the work, Petr Komarek contacted the Czech Road Society, and ten specialists from Czech technical committees and other technical specialists helped him to populate the database. The translation was complete by the end of 2010. There is a wish to translate the navigation screens of the Terminology application into Czech (cf. Section 1.3.2.1). In addition, the Czech Road Society has decided to have a new printed version of the Dictionary, after fifteen years.

The Czech Road Society website has a terminology tab with a link to the PIARC website. An item on terminology was presented during a conference in the Czech Republic in November 2010. An article in Routes/Roads No. 349 details the Czech progress.

1.3.3.4 Estonian

In February 2011, Marek Truu of the Technical Centre of Estonian Roads (TECER) contacted CTERM asking for files for him to translate the PIARC Dictionary into Estonian. A subsequent e-mail confirmed that he would undertake the translation. The question of editing rights remains to be settled in case he wishes to work directly on-line.

1.3.3.5 German

With Annelies Glander (Austria), Hans Walter Horz (Germany) and Alain Jacot (Switzerland), three German-speaking countries are represented in CTERM. It was agreed to give the on-line editing rights to Mrs Glander, with a deadline be set for Messrs Horz and Jacot to comment on her proposals for German terms. German from Germany is to remain the reference, with Austrian and Swiss equivalents denoted by AT and CH, respectively.

As stated in Section 1.3.2.1, a language slot was opened for the translation of the PIARC Lexicon into German, so as to enable Mrs Glander to enter German terms from the lists discussed in Quebec, Prague and Zurich and from a new list yet to be discussed in the subject area of traffic calming (see Section 1.3.1). Since such a procedure would represent a very intensive working process, respective provisions would have to be arranged for by the Austrian First Delegate.

1.3.3.6 Greek

During the previous inter-congress period and at the PIARC World Road Congress in Paris, there were contacts between Patrice Retour and Demetrios Konstantinidis for a translation of the PIARC Dictionary into Greek. In January 2009, CTERM received an e-mail from Mr Konstantinidis saying that a team was being assembled to undertake the translation. There has been no further news since, in spite of two reminders.

1.3.3.7 Hungarian

At the time of drafting this report, the Hungarian translation of the PIARC Dictionary on-line is 75% complete. Balazs Sziranyi has formed a working group within the Coordination Centre for Transport Development to help him, especially with financial and economic terms. He hopes to have the job finished prior to the World Road Congress in Mexico.

An article in Routes/Roads No. 349 details the Hungarian progress.

1.3.3.8 Persian

A Persian list of terms in the areas of road, traffic and transportation engineering, with English translations, was presented by Mohsen Rahimi, who recently joined CTERM as an Iranian member, during the meeting in Zurich. It is available both in a hard-copy (1,200 pages) and a soft-copy version. This list will provide a solid basis for a Persian translation of the PIARC Dictionary by Mr Rahimi and his assistant Mahsa Mehrpouya, who joined CTERM as a corresponding member and has been given editing rights for the Persian language. Work on the translation has started and will continue through the next inter-congress term.

1.3.3.9 Portuguese

In the light of the PIARC World Road Congress being held in Mexico and the consequent focus on Latin American Spanish phraseology, Ana Cristina Freire is completing her search for Brazilian synonyms, which differ in spelling.

1.3.3.10 Romanian

At the time of drafting this report, the Romanian translation of the PIARC Dictionary on-line is 75% complete. Ariadna Nicoara, who attended several CTERM meetings as a corresponding member, is still experiencing problems with finance and ITS terms. Nevertheless, she hopes to have accomplished this mission in time for by the congress in Mexico.

1.3.3.11 Russian

A request was received from the Nordic Road Association (NVF) to translate the specific dictionary on Road Transport Informatics into Russian. Finland was to liaise with the University of St. Petersburg. An export of the existing dictionary in the appropriate format was sent to Caj Holm, the project manager, to allow for an “automatic” update.

In view of the publication of the second edition of the basic English version of the ITS dictionary (see Section 1.3.1) and the prolonged illness of Mrs Olishenko (in charge of the final revision), work on this translation has been aborted. The project is currently at a standstill.

1.3.3.12 Spanish

In the light of the PIARC World Road Congress being held in Mexico, the Spanish version of the PIARC Dictionary was updated, including Latin American Spanish phraseology.

For the “reference” Spanish terms, Cristina Higuera Toledano contacted the Asociación Técnica de Carreteras (ATC – the Spanish National Committee of PIARC). A working group was formed with specialists in the various subject areas covered by the PIARC Dictionary. As a first step, the various chapters of the Dictionary were circulated for the translation of the new terms. The next step was to revise the translation of the remainder of the terms.

As for Latin American phraseology, terms (national variants as well as terms agreed within CO.PA.CA) were extracted from the Spanish version of the 6th printed edition of the PIARC Dictionary and imported into the database. A call for the support of the First PIARC Delegates of Latin American countries was made in Routes/Roads No. 344. Cooperation in revising and complementing these terms was obtained from Ada Lia Gonzalez (CENATTEV, Argentina), Rosa Maria Morales Rodriguez (Public Works Ministry, Costa Rica) and Ricardo Solorio Murillo (Mexican Institute of Transportation, IMT). Attempts to contact the Cuban member of CTERM and the network “Camineros en la red” (a group of professionals, students, etc. in civil engineering and transportation, active throughout Latin America) have been less successful.

1.3.3.13 Ukrainian

Comments (including a request to correct the name of our Committee) were sent to Mr Zolotarev on the cover suggested for a printed version of the Ukrainian translation of the PIARC Dictionary as uploaded by Patrice Retour in 2007.

1.3.3.14 Other languages

CTERM members are frequently asked about Chinese. This would be a good point for the future.

Per Morten Lund, a former member of CTERM, was asked about translations into Danish and Swedish, but replied that both national organizations were “in transition” and were unlikely to undertake any terminology work for the time being.

In requesting Finland to liaise with the university of St. Petersburg (see Section 1.3.3.13), the Nordic Road Association (NVF) regretted the absence of Finnish from the Terminology database.

Italian has not been worked on since Mr Moraldi was a member of CTERM in the 1990’s. During the meeting in Zurich it was suggested there could be Italian support from Switzerland if an Italian native speaker who understands English and/or French well could be identified and someone from Italy could be found to check.

The Japanese version of the PIARC Dictionary is currently 52% complete. In the previous inter-congress period (2004-2007) there were initiatives to work on it. CTERM tried to reactivate the work by contacting the predecessor, who did not have time to complete the job. The PIARC General Secretariat contacted Japan and the response was that it was not really needed as they worked in Japanese only.

A language slot was opened for the translation of the new specific dictionary on road tunnel operation (see Section 1.3.1) – but not yet the PIARC Dictionary – into Korean.

1.3.4. Internet terminology services

Throughout the 2008-2011 period, CTERM has continuously received requests, comments and suggestions by common users of the database completing and sending a form which is displayed after clicking either the “Contact” button on the homepage or the button “Submit your remarks on this term” at the bottom of a sheet showing the result of a term search. Examples include:

- several suggestions from Sueli Santos for Brazilian synonyms in the Portuguese version of the PIARC Dictionary;
- a request on where to order document FGSV-Nr. 005/6 (a hard-copy version of the German translation of the PIARC Dictionary published by FGSV in Germany);
- requests from Olga Prushinskaya:
    - to restore the truncated Russian definition for the concept “cantilever/console” in the Dictionary. CTERM was able to comply with this request by using the original file of the Russian version (obtained from Patrice Retour);
    - to correct the Russian term for the concept “bearing / appareil d’appui” in the Dictionary;
- a request by “Kneipp Traduction” for a definition of the French terms “convenance” (= fitness for purpose, fitness for (intended) use) and “récolement” (= verification (for compliance/agreement)). The concept was added to the database;
- a request by Karen Westergaard for a definition of the term “autograde”;
- a request by Arndt Schwab for English and French equivalents of several German terms in the area of traffic calming (see Section 1.3.1);
- a request by Michel Thomidis on where to obtain a hard copy of a Greek translation of the PIARC Dictionary.

Other questions of a more technical nature (e.g., minimum length of tunnels) were forwarded to the competent technical committees.

2. FUTURE ACTIVITIES

2.1 Composition of CTERM

An ideal team for the Committee on Terminology would have an active British, French and Spanish secretary, and also representatives of other countries speaking English, French and Spanish – in addition to members representing a maximum number of languages, to promote the involvement of national committees (see Section 2.3) with a view to enriching the database with translations into other languages. Such was the case in 2008-2011 for Czech, German, Hungarian, Persian, Portuguese, Romanian, and Spanish. For 2012-2015, their continued presence would be most desirable (to keep the database up to date), as would be extensions to further languages – especially those mentioned in Section 1.3.3 for which planned work was not completed or contacts were unsuccessful in 2008-2011.

Members from countries outside Europe may be corresponding members, to reduce costs of travel.

CTERM membership should be a good mix of linguists with practical training and persons with technical skills and experience in the subject matters to be dealt with.

2.2 Involvement of the technical committees

CTERM is composed of a limited number of members whose knowledge and competence do not cover the full range of subject areas dealt with in PIARC and, particularly, the specialities within these areas. Although all PIARC technical committees have appointed terminology correspondents, it has been the experience of CTERM that, with a few exceptions (especially TC B.2 on Road Network Operations and TC C.4 on Road Tunnel Operations), the response of the terminology correspondents to the calls of the contact persons for proposals has been rather poor. **Input for the revision of the PIARC Dictionary and Lexicon must come from the technical committees**. The Dictionary and Lexicon should be the reference works of the technical committees that are active within PIARC. It is in their interest to revise terminology and transmit specialized vocabulary in their specific areas of expertise to CTERM.

One way to enhance the involvement of technical committees could be to have all terminology correspondents attending the second CTERM meeting (about one year) after each PIARC World Road Congress and to have TC members invited to attend CTERM meetings from time to time – especially from the committees that never react.

On the other hand, CTERM would like to see the recommendation for technical committees to include a bilingual “terminology” section (French-English) in each specialized technical report maintained in the Blue Guide for 2012-2015, and that these sections be sent to CTERM systematically.

2.3 Involvement of the national committees

The work and products of CTERM are still little known to the national committees of PIARC. The circle of editors of the PIARC Terminology database also includes national terminology correspondents to be designated by the First Delegate in each PIARC member country, in order to translate and/or revise terminological information in the language of their country.

Translations of the basic versions of the Dictionary and Lexicon into other languages are the responsibility of the respective national committees. The involvement of these Committees should be encouraged in order to make maximum use of the multilingual potential of the PIARC Terminology database.

2.4 Contents of the database

The structures of the Dictionary and the Lexicon do not reflect the technical committee structure, because changes in the technical committee structure are more frequent than those in the organizations of the Dictionary and the Lexicon into chapters. That is why technical committees have reported difficulty with the structure of the Dictionary or the Lexicon when they wish to review the terms for a specific subject area. Nevertheless it is not sure that the adaptation of the Dictionary and the Lexicon to the organization of the technical committees every four years would be efficient: changes in the identification of terms would affect all the linked languages and the cost-benefit ratio of this change might be small.

In developing and updating the basic version of the Dictionary, the opinions of representatives in CTERM were long divided between two alternatives

- to create a definition for each term, like in most specialized dictionaries. This represents the view of those who believe that restricting the number of definitions in the Dictionary is incompatible with the development of a project as ambitious as PIARC Terminology. Furthermore, to allow unequivocal translation into a target language, they consider that any term or expression must be unambiguous in the source language. To attain this objective in technical terminology, a definition is absolutely necessary;
- the other is to define only specific road terms (such as “ring-and-ball test”) not known to non-specialists, and general terms (such as “ageing”) that have a specific meaning in road technology. This option raises the problem of assessing what non-specialists may know or may not know, but has the advantage of avoiding “inflating” the Dictionary to a volume that would be too bulky for practical use and make translations of the Dictionary into other languages prohibitively costly in many countries.

The second alternative appears to have prevailed since the Durban Congress in 2003 and is, therefore, recommended for the future.

In the same context, CTERM considers that bringing all the terms contained in the Terminology database together in one dictionary with a matrix structure would result in more reluctance to translate. This may be illustrated by Belgium and the Netherlands having been the only countries so far to translate the Lexicon. On the other hand, CTERM would like the Sweco dictionary to disappear as a specific dictionary from the database, after comparison with the PIARC Dictionary (for additional terms not contained in the latter).

Better use should be made of the possibilities of data processing to supplement the Dictionary with illustrations.

2.5 PIARC and standardization (ISO and CEN)

English and French are the official languages for international standardization (ISO), and English, French and German are the official languages for European standardization (CEN). The updating of the PIARC Dictionary provides an opportunity for dissemination and use in ISO and CEN working groups.

Although feedback from these working groups in the form of internationally agreed terms and definitions is hampered by the fact that terminology work in ISO and CEN is usually limited to the context of a specific standard – whereas that in PIARC is more comprehensive in scope –, it would be useful to establish and maintain contacts with the various ISO and CEN working groups active in road and road-related fields. Members of PIARC technical committees who participate in ISO and CEN working groups should be encouraged to report on ISO and CEN terminology work to the terminology correspondents in their committees. This would enable PIARC, ISO and CEN to harmonize their terminologies for the benefit of the international road community.

2.6 PIARC and TERMIUM Plus®

TERMIUM Plus® is a terminology and linguistic data bank containing terms, synonyms, acronyms, definitions, phraseology units, examples of usage and observations in a wide variety of fields such as administration, science and informatics; almost four million terms are in English and French, more than 200,000 are in Spanish, and more than 18,000 are in Portuguese. Its main purpose is to harmonize the terminology used by the Canadian administration. The Canadian Government has been developing the database for thirty years, constantly updating and improving it. The search facility is similar to that of the PIARC database.

The two-year agreement granting six CTERM members access to TERMIUM Plus® was superseded by the decision of the Canadian Government early in 2010 – announced by René Gemme in the Quebec meeting – to put TERMIUM Plus® on the web for free public access. Mutual use of TERMIUM Plus® and PIARC Terminology information (with acknowledgement) should have a “cross-fertilizing” effect on both sides.

2.7 Improving the on-line service

Statistics obtained through a Google account indicated that in 2008-2011 the number of visitors to the PIARC Terminology site ranged roughly between sixty and one hundred on weekdays and about twenty on weekends, although it is unclear how many of the visitors were CTERM members. The use of the site remained quite constant, but restricted to Western Europe and Canada. It is hoped that the use of the database will increase following the Mexican Congress.

Next CTERM should consider how to improve the on-line service. A pop-up user satisfaction survey of users may be useful for that – with a few simple questions as suggested in 2008-2011 to the PIARC General Secretariat and Commission on Communications and International Relations, as follows:

- Dear user, could you spare a few moments to answer three simple questions? (Two clickable options: “Don’t show this again” and “OK”.)
- Did you find what you were looking for ? (“Yes” or “No”.)
- If the answer to the previous question is “No”, what exactly were you looking for? (This should go blank if the answer to the previous question was “Yes”.)
- In your opinion, what could be done to make the application more user-friendly?

2.8 Working environment

The arrangement for CTERM to work directly under the General Secretariat has worked well in 2008-2011, especially with Marie Pastol as a liaising member. It is recommended that this arrangement be continued in future.

Attendance at meetings was hampered at times by the cost of travel. CTERM should avoid long travel in future, e.g., meetings outside Europe. Teleconferencing would be helpful in this respect and would also enable correponding members to take part in the meetings.

The Folders section of CTERM’s workspace on the PIARC website, which was managed by René Gemme in 2008-2011, greatly facilitated the sharing of – especially bulky – documents. On the other hand, the Forum section was not used as e-mailing was felt to be more effective for the progress of work between meetings.

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STRATEGIC THEME A SUSTAINABILITY OF THE ROAD TRANSPORT SYSTEM

Introduction

The goal of Strategic Theme A “Sustainability of the Road Transport System” was to encourage the development of road transport policies and programmes that result in beneficial community outcomes for sustainable and safe mobility in economic, environmental and social terms, with special attention paid to energy issues and the mitigation of the impacts on climate from the road transport system.

Strategic Theme A brings together the priority issues for road administrations for a sustainable development of the road transport system and built on the work of the previous cycle.

Strategic Theme A coordinated the work of four Technical Committees: Preserving the Environment (TC A.1); Financing, Managing and Contracting of Road System Investments (TC A.2); Road System Economics and Social Development (TC A.3), Rural Road Systems, and Accessibility to Rural Areas (TC A.4).

Climate change has become a major issue as the understanding of the effect and its impact has improved. The contribution of road transport to global carbon emissions is significant and is a worldwide issue. The objective was to examine what road authorities can do, whether through the activities of construction, maintenance and operations or influencing the use of the network. Technical Committee A.1 was assigned to bring together national’ strategies, plans and techniques for reducing their carbon footprint.

The increasing need for socio-economic development has continued the trend towards continually improving the provision of road infrastructure. This often leads to increasing pressure on budgets, in turn leading road authorities to look to more creative ways to finance and procure road improvements and maintenance. This also demands new skills from road authority clients in terms of managing and operating the contracts. These aspects were the starting point for the work of Technical Committee A.2.

Road investment can generate substantial economic benefits and foster improved quality of life. Being able to document these benefits is important to assist national leaders in their allocation of limited resources. Technical Committee A.3 was tasked to examine the strategy of road pricing and revisit how social impacts can be assessed.

Accessibility of road infrastructure for rural communities remains an important topic for poverty alleviation. Technical Committee A.4 focused on involvement of communities at all stages from planning to the provision of sustainable solutions to maintenance of roads and on how to obtain sustainable rural roads.

The global financial crisis which burst in September 2008 and the evolution of the economic situation of a number of countries greatly affected investment programs and the financing schemes, which were initially envisaged. The importance of the impacts led Technical Committees A2 and A3 to take on board this new context during their work cycle.

An important facet of the activity of the Technical Committees is the seminars and workshops in order to meet the missions of the World Road Association to promote sharing of knowledge.

Thus TC A1 held two seminars, one in Romania on “Environment and sustainable transport” and the other one in India on “Reduction of the carbon footprint in road construction”.

TC A2 organized together with AGEPAR and ARMFA, in Burkina Faso, a seminar on “Road maintenance techniques and financing methods”, then two workshops, one in Morocco on “Financing of road infrastructures” with the participation of several development banks and the second one in Japan on “Public-Private Partnerships in the Road Sector”; these two workshops focussed on the effects of the global financial crisis.

TC A3 held a seminar in Hungary on “Implemented and Envisaged Road Toll Policies in Central-Eastern European Countries” and a workshop in Singapore on “Road system economics and social development”.

TC A4 organized two seminars, one in India on “Sustainable maintenance of rural roads” and the second one in Bolivia on “Sustainability of rural roads networks”.

The results of the work of the Technical Committees are expressed in articles published in Routes/Roads and in technical reports, which references are given in their activity report and will be presented during the sessions of the XXIVth World Road Congress in Mexico, in September 2011. Their publication on the website of the Association will follow.

TECHNICAL COMMITTEE A1
PRESERVING THE ENVIRONMENT

2008-2011 ACTIVITY REPORT

CONTENTS

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1. OVERVIEW

1.1. Introduction

This PIARC Activity Report presents an overview of activities undertaken by Technical Committee A.1: Preserving the Environment during the 2008-2011 period. It outlines the work programme of the Committee and the resulting outputs. It does not contain detailed information on the Committee's findings or recommendations, as these are set out in the Working Group Reports.

1.2. Committee Focus

The Committee's work programme comprised three key issues, which are discussed further below:

Issue 1 *Climate change: National policies and strategies for reducing the impacts of the road transport system on climate change and policies and strategies for the adaptation of transport systems to climate change*

Climate change mitigation and adaptation are integral dimensions of managing climate change in transportation, and TC A.1 addressed both when considering Issue 1.

Issue 2 *Monitoring of environmental impacts*

Issue 2 had a strategic evaluation focus, looking at how the environmental impacts of road transport are measured and how this informs subsequent actions. It was decided to focus on the following issues: air and climate, noise, hazardous substances and major accidents, waste management, soil, water resources, biodiversity and landscape.

Issue 3 *Alternative energy sources: Monitoring alternative solutions for fossil fuels for the road system*

The focus of Issue 3 was on using renewable energy sources to generate energy for highway infrastructure. Options to reduce energy consumption within highway operations were also investigated.

2. WORK PROGRAMME

2.1 Issue 1: Climate change adaptation and mitigation in transport networks

This issue focuses on the measures that transport agencies have taken to reduce greenhouse gas emissions (GHGs) and to address the effects that climate change is likely to have on transport networks through adaptation. The information was gathered via a survey instrument and supplemented with country and international reports, as well as the direct experiences of TC A.1 members.

The working group report provides an overview of the overarching policies and approaches that countries have planned or implemented, which provides the overall framework for GHG reduction. It also gives examples of the many ways that transport agencies have attempted to reduce GHGs under the following categories:

- fiscal initiatives, including taxation and incentives
- behavioural activities, including public transit, cycling and land use integration
- vehicle technologies, including fuel economy standards and low carbon fuels
- road transport activities, including planning, construction, maintenance and operations.

As adaptation is an emerging issue for transport agencies, a description of the key issues is given, and examples about the extent to which transport agencies are currently addressing climate impacts is provided.

A progress report was presented to a meeting of the Indian Roads Congress in February 2011. The final report will be presented to the World Roads Congress in Mexico in September 2011.

2.2` Issue 2: Environmental monitoring of road transport impacts

The report on Issue 2 is based on the findings of a two part survey among 24 participating PIARC countries that served to identify current practice. The surveys were complemented with a literature review conducted through the web.

The first questionnaire asked participants to describe what is being monitored for each environmental topic (eg. air quality, biodiversity, noise), differentiating the monitoring activities according to four phases of infrastructure planning and development.

Following analysis of the responses to the first questionnaire, a second questionnaire was conducted with more precise questions. The topics addressed were air, biodiversity, climate, soil and water. In a few cases the second questionnaire was accompanied with a country specific report that addressed a special topic.

The final report will reflect input from Australia, Austria, Canada, Cuba, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iran, Japan, Mexico, New Zealand, Norway, Portugal, Romania, Slovakia, South Africa, Sweden, Switzerland, UK and USA. It will contain case studies illustrating current monitoring practices, analysis and recommendations. The findings from Issue 2 will be presented to the Mexico World Road Congress in September 2011.

2.3 Issue 3: Alternative energies in the operation of transport infrastructure

Climate change drives us to consider minimising the use of energy and finding alternative ways of generating energy from non-fossil fuels. The use of renewable energy also provides opportunities to reduce network operating costs and improve efficiency on increasingly actively-managed road networks.

The Committee's report on Issue 3 is based on a review and analysis of multiple case studies from a range of countries including Europe, United Kingdom and America. The case studies were identified from TC A.1 member experience, International Road Federation member experiences and a web review.

The case studies cover five categories:

a) thermal collection using pavements
b) photovoltaic collection
c)wind micro generation
d) water micro generation
e) new materials to reduce requirements for lighting and new technologies to reduce energy demand.

Analysis focused on a range of criteria including whole of life costs and benefits, environmental implications, maintenance and operation implications, greenhouse gas emissions, transferability and availability of the approach. As these tend to be emerging applications, some information is incomplete. These areas are identified in the report and will become clearer over time as these technologies are applied in a wider range of countries and circumstances.

A summary of the learnings from the case studies will be presented at the forthcoming World Road Congress.

3. COMMITTEE OUTPUTS

The Committee comprised 29 active members and met seven times in order to prepare detailed reports on the three issues outlined above. The reports written by the Committee are as follows:

a) PIARC Technical Committee A.1 Working Group 1: Climate Change Mitigation and Adaptation Policies and Approaches
b) PIARC Technical Committee A.1 Working Group 2: Monitoring of Environmental Impacts of Roads
c) PIARC Technical Committee A.1 Working Group 3: Monitoring alternative solutions for fossil fuels for the road system.

In addition, Committee members provided or contributed to four articles for the *Routes and Roads* publication:

a) Roads and Wildlife – E18 motorway building and planning projects from an ecological perspective (No. 344, 2009)
b) The Swiss Defragmentation Program – a global approach (No. 344, 2009)
c) Transport solutions that support community outcomes in New Zealand (No. 343, 2009)
d) A comparison of environmental impacts of hot and half-warm mix asphalt (to be published, 2011).

Co-hosting two successful international seminars were also a key achievement. The seminars focused on:

a) 'Environment and Sustainable Transport' held in conjunction with TC B.4 (16 – 18 September 2009, Timisoara, Romania)
b) 'Reducing the Carbon Footprint in Road Construction' (17 – 20 February 2011, New Delhi, India).

In addition to the international seminars, Committee members participated actively in several fora over the period, including:

a) 'Roads and Climate Change' (October 2008, Glasgow, Scotland)
b) 88th Annual Meeting of the Transport Research Board that focused on climate change (January 2009, Washington DC, USA).

The Committee also met with TRB's Special Taskforce on Climate Change and Energy on 11 January 2009 in Washington DC to discuss draft white papers on climate change. Discussions also took place with members of the Indian Roads Congress on 15 February 2011 to exchange information on environmental management practices, prior to the International Seminar.

Given its focus on sustainability, the Committee monitored carbon emissions generated from member travel to official Technical Committee meetings. This showed approximately 168.8 tonnes of CO_2 was emitted from meeting travel for the 2008 – 2011 period. This data shows the importance of carefully selecting meeting locations in relation to active committee members. It also raises the question of how PIARC can utilise technology more effectively in the future to reduce long-haul air travel, while at the same time increasing participation from members in developing countries.

4. CONCLUSION

Technical Committee A.1 has utilised available resources during the preceding period to add to the international body of knowledge about sustainable transport. It has identified best practice in the areas of reducing carbon emissions, adapting infrastructure to cope with the likely effects of climate change and monitoring the impacts of transport. In the field of alternative energy generation and use it has identified a range of practices that offer potential to reduce the energy burden of transport infrastructure through the use of renewable energy sources.

The key outputs of the Committee are the three working group reports. These have been informed by surveys of member countries, research and analysis and the findings and observations from two international seminars.

TECHNICAL COMMITTEE A.2
ON FINANCING, MANAGING AND CONTRACTING OF ROAD SYSTEM INVESTMENT

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Brian Noble, Australia
Vincent Scarcella, Australia
Christain Nagl, Austria
Volker Rux, Austria (from July 2009)
Alain Charlebois, Canada
Richard Deslauriers, Canada
Mike Goodale, Canada
Milos Cihak, Czech Republic
Michael Schroder, Denmark (to December 2010)
Matti Vehviläinen, Finland
Samira Irsane-Semaan, France (to August 2010)
Chadi Khaled, France
Jean-Francois Langumier, France
Helen Tyrogianni, Greece
Sarantis Pantelias, Greece
Miklós Kedves, Hungary (to March 2010)
István Kövesdi, Hungary (from April 2010)
Csaba Orosz, Hungary
Kristin Sigurbjornsdottir, Iceland
Hormoz Zakari, Iran
Maria Pia Cerciello, Italy
William Komenan, Ivory Coast
Takaaki Nambu, Japan
Young-In Kwon, Korea
Ioly Robinson, Madagascar
Mory Kante, Mali
Amado Athie Rubio, Mexico
Mohammed El Moueden, Morocco
Hicham N'Hammoucha, Morocco
Rui Soares, Portugal
Juraj Cermak, Slovakia (up to August 2010)
Ludmila Vodzinska, Slovakia (from September 2010)
Tomaz Kosic, Slovenia
Corne' Roux, South Africa
Francesco Criado Ballesteros, Spain
Gerardo Gavilanes Gineres, Spain
Gunnar Tunkrans, Sweden
Geert Fuchs, The Netherlands
Henri Chua, United Kingdom
Darren Timothy, United States of America

1. GENERAL AND CONTENTS

1.1. General

The activities of Technical Committee A.2 – Financing, Managing and Contracting Road System Investment have supported the PIARC 2008-2011 Strategic Plan's Strategic Theme A – Sustainability of the Road Transport System. Strategic Theme A focuses on

the priority issues for road administrations on the three dimensions (economic, environmental and social) of sustainability. In particular TC A.2 was to consider effective measures in both developed and developing countries that support sustainable development, such as the role played by the private sector in delivering road services, funding and financing strategies, and contractual and procurement strategies of engaging the private sector in road maintenance and operations.

1.2. Work Programme and Organization

TC A.2 was organised into two working groups: Sub-group 1 – Exploration of funding and financing strategies; and Sub-group 2 – Contractual arrangements and procurement strategies for private sector participation in sustainable road maintenance and operations. However, there was significant joint working by the two sub-groups, particularly on reviewing the roles of public and private sectors in sustainable road systems.

1.2.1 Sub-group 1 – Funding and Financing Strategies

Sub-group 1 explored the following strategy:

- Examine the different approaches employed for funding and financing strategies for sustainable road systems.

The group was under the leadership of Takaaki Nambu, Japan. and other group members included: Samira Irsane-Semaan, France; Csaba Orosz, Hungary; Maria Pia Cerciello, Italy; Ioly Robinson, Madagascar; and Juraj Cermak, Slovakia.

The group focused its work on sources of road infrastructure funding. The approach used was to describe existing organisations and funding mechanisms and to analyse existing and future trends. Information for these areas was provided by TC A.2 committee members for their individual countries through a comprehensive survey. Additional survey information was also gained from selected PIARC members not represented in TC A.2. From the survey it was determined there are essentially five possible road type classifications with four possible ownership/responsibility authorities. One finding indicates that private roads under private ownership/responsibility are still a small portion of the road network in all countries. Payments by road users (and vehicle owners), which are very substantial, were analysed. Other sources for funding road services, e.g. donor funding and land-use development charges, also were examined. With exception of tolls and user charges paid, the analysis of flow of funds indicates that much of these revenues collected are no longer hypothecated or earmarked for road (and other transport) expenditure. The results of this analysis will be part of the final report of the Committee.

Working with the Committee on Terminology the group also finessed the definitions for “financing” and “funding”.

1.2.2 Sub-group 2 – Cost Management for Long Term Investment

Sub-group 2 considered the following strategy:

- Explore the different approaches to the procurement of services relating to maintenance and operations, as well as design and construction projects to provide levels of service consistent with user expectations and road hierarchies.

The sub-group was chaired by Brian Noble, Australia. and included: Christian Nagl, Austria; Alain Charlebois, Canada; Richard Deslauriers, Canada; Michael Schroder, Denmark; Matti Vehviläinen, Finland; Chadi Khaled, France; Helen Tyrogianni, Greece; William Komenan, Ivory Coast; Amado Athie Rubio, Mexico; Hicham N’Hammoucha,

Morocco; Corne Roux, South Africa; Francisco Criado Ballesteros, Spain; and Gunnar Tunkrans, Sweden.

To develop the strategy, the sub-group emphasised the following:

- Contractual arrangements for private sector participation; and
- Procurement procedures to engage the private sector.

Research on these issues encompassed desktop literature review and survey of TC A2 members who provided case studies. Seven broad types of contractual arrangements for private sector road maintenance and operations were identified. Traditional procurement methods with and without prequalifications, and newer procurement procedures involving discussions between the road authority and the private sector partner to optimize the specifications and terms and conditions also were established. The results of the sub-group's work will be part of the final report of the Committee.

1.3. Meetings and Technical Visits of the Committee 2008-2011

The Committee Members representing the Host Country, in collaboration with the PIARC National Committees, organized the regular meetings of TC A.2. On average 20 members of the Committee attended each session. The meetings were composed of an opening plenary session which addressed on-going activities of PIARC and presented communications from the Secretary General of PIARC and other PIARC Committees. Then the individual sub-groups met to conduct their work and a final plenary session was held to present progress reports on sub-group activities. Each meeting, with the exception of the inaugural and the last ones, also included either a seminar, workshop or panel discussion on themes relating to financing, managing and contracting road investments.

The meetings allowed sharing of information about Committee research efforts and activities underway in individual countries. After the meetings, minutes prepared in English, French and Spanish were sent to PIARC and were posted on the website. TC A.2 was extremely fortunate to have the services of the Secretaries in all three languages (up to August 2010). In addition to the working sessions, host countries arranged workshops, seminars and technical tours during the Committee's meetings.

Meetings including workshops, seminars and technical visits of TC A.2 were held as follows:

1. Paris, France	April 2008
2. Ouagadougou, Burkina Faso	December 2008
3. Rabat, Morocco	April 2009
4. Osaka, Japan	October 2009
5. Toronto, Canada	June 2010
6. Johannesburg, South Africa	November 2010
7. Salzburg, Austria	April 2011

1.4. Products (publications, seminars and participation in other events)

Route/Roads. 2008, No. 339, pp.2-3, 60-65, 66-71

Francisco Criado Ballesteros (Spain, Member TC A.2), Editorial.
Amado Athie Rubio (Mexico, Member TC A.2), Mexico: Future Directions For Road Maintenance Financing "User Services, Safe Circulation And Accurate Signage".
Amado Athie Rubio (Mexico, Member TC A.2), Mexico: Experience Gained In Public-Private Partnerships.

International Seminar on Road Maintenance Management Techniques and Financing Methods, Ouagadougou, Burkina Faso, 2-3 December 2008

Alain Charlebois (Canada, Member TC A.2), Session Moderator.
Mike Goodale (Canada, English Secretary, TC A.2), Session Moderator.
Alain Charlebois (Canada, Member TC A.2), Road Infrastructure Investments And Financing Under The Responsibility Of The Ministry Of Transports Of Quebec.
Francisco Criado Ballesteros (Spain, Member TC A.2), A New Approach To Public-Private Partnership For Rehabilitation And Maintenance Of Motorways In Spain.
Hormoz Zakari (Iran, Member TC A.2), Presentation Of Solutions For Improving Road Maintenance Management And Financing In Iran.
Christian Nagl (Austria, Member TC A.2), Example For Quality Prescriptions And Quality Assessment In PPP Contracts.
Takaaki Nambu (Japan, Member TC A.2), History Of Road Development, Finance And Investment In Japan.
Ioly Robinson (Madagascar, Member TC A.2), The Impact Of Overloading On Road Maintenance Financing.
Ioly Robinson (Madagascar, Member TC A.2), Example Of Southern Africa Second Generation Road Maintenance Funds: Case Of Madagascar.

Route/Roads. 2009, No. 342, pp.12-19, 20-29, 30-35

Bill Halkias and Helen Tyrogianni (Greece, Member TC A.2), PPP Projects In Greece: The Case Of Attica Tollway.
Caroline Visser (IRF Geneva, Member TC A.2), The Economic Advantages Of Public-Private Partnerships.
Henri Chua (United Kingdom, Chair, TC A.2), *Richard Deslauriers* (Canada, Member TC A.2) and *Koos Smit*, Successfully Applying PPP For Sustainable Road Systems.

Route/Roads. 2009, No. 344, pp.10-11, 38-43

Samira Irsane-Semaan (France, French Secretary, TC A.2), Update: Burkina Faso - International Seminar On Technical Management Of Road Maintenance, 2-3 December 2008, Ouagadougou.
Amado Athie Rubio (Mexico, Member TC A.2), Provision Of Road Infrastructure In Mexico Facing Up To The Financial Crisis.

Country Workshop on Impact of Global Financial Crisis on Financing of Road Infrastructures, Rabat, Morocco, 14 April 2009

Henri Chua (United Kingdom, Chair, TC A.2), Workshop Moderator.
Amado Athie Rubio (Mexico, Member TC A.2), How Financial Crisis Has Affected Road System In Mexico?
Samira Irsane-Semaan (France, French Secretary, TC A.2), The French Economic Recovery Plan – Transport Infrastructure Pillar.
William Komenen (Ivory Coast, Member TC A.2), Impacts de la crise financière mondiale sur le réseau routier en Côte d'Ivoire et quelques réponses.
Hicham N'hammoucha (Morocco, Member TC A.2), Le financement des infrastructures routières au Maroc.
Corne' Roux (South Africa, Member TC A.2), The Effect Of The Global Financial Crisis On Roads In South Africa.

Michael Schroder (Denmark, Member TC A.2), Presentation On The Case Of Denmark.
Caroline Visser (IRF Geneva, Member TC A.2), Impacts Of Financial Crisis On PPPs.

International Seminar on Public-Private Partnerships in the Road Sector, Osaka, Japan, 13-14 October 2009

Amado Athie Rubio (Mexico, Member TC A.2), PPPs For Highways, Mexican Experience.
Juraj Cermak (Slovakia, Member TC A.2), PPP Motorway Projects In Slovak Republic.
Henri Chua (United Kingdom, Chair, TC A.2), Public Private Partnerships - What Next?
Richard Deslauriers (Canada, Member TC A.2), The Effects Of The Credit Crisis On The Ability To Finance PPPs For Roads.
Gerardo Gavilanes Gineres (Spain, Spanish Secretary, TC A.2), Spanish Roads' PPP Contracts: Evolution And Future.
Mike Goodale (Canada, English Secretary, TC A.2), Alternative Financing Highway Projects In Ontario, Canada.
Young-In Kwon (Korea, Member TC A.2), Private Financing Of Expressway Projects In Korea.
Jean-François Langumier (France, Member TC A.2), Motorway Concessions In France And The Example Of The Autoroutes Paris-Rhin-Rhône Group - APRR.
Christian Nagl (Austria, Member TC A.2), The Austrian PPP Experience In The Road Sector.
Takaaki Nambu (Japan, Member TC A.2), Closing Remark.
Brain Noble (Australia, Member TC A.2), Alliance Contract In Australia.
Corne' Roux (South Africa, Member TC A.2), PPPs In Road Construction: The South African Experience.
Gunnar Tunkrans (Sweden, Member TC A.2), Congestion Charging In Stockholm.
Matti Vehviläinen (Finland, Member TC A.2), Experiences From A Finnish PPP Project Using Project Life-Cycle Management From The Order Perspective To Maximise Efficiency.

Country Workshop on Public Private Partnerships and Alternative Financing in Canada, Toronto, Canada, 17 June 2010

Alain Charlebois (Canada, Member TC A.2), Workshop Moderator.
Richard Deslauriers (Canada, Member TC A.2), PPP In The Canadian Roads Sector.

Country Workshop on Road PPP Experience in South Africa, Johannesburg, 4 November 2010

Henri Chua (United Kingdom, Chair, TC A.2), Session Moderator.
Corne' Roux (South Africa, Member TC A.2), Session Moderator.
Richard Deslauriers (Canada, Member TC A.2), PPP In The Canadian Roads Sector.
Gerardo Gavilanes Gineres (Spain, Spanish Secretary, TC A.2), Spanish Roads PPP Contracts.
Brain Noble (Australia, Member TC A.2), Alliance Contract In Western Australia.
Gunnar Tunkrans (Sweden, Member TC A.2), Congestion Charging In Stockholm.

TECHNICAL COMMITTEE A3
ROAD SYSTEM ECONOMICS
AND SOCIAL DEVELOPMENT

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Ernest Albuquerque, New Zealand
Fred Amonya, United Kingdom
Anis Balafrej, Morocco
Kian-Keong Chin, Singapore
Alberto Compte, Spain
Pascaline Cousin, France
Patrick DeCorla-Souza, United States
Cheik Oumar Diallo, Mali
Claus Gade, Denmark
Laurent Gnalin, Côte d'Ivoire
Anton Goebel, Finland
Alfredo González, Spain
Maxime Jebali, France
Fannie Joubert, Canada
Petri Jusi, Finland
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Ana Maria Leyton, Canada
Agustín Melo, Mexico
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Hanne Samstad, Norway
Hans Sarua, Papua – New Guinea
Friedrich Schwarz-Herda, Austria
Malika Seddi, France
Arpad Siposs, Hungary
Vratislav Skvor, Czech Republic
Adam Torok, Hungary
Guillermo Torres, Mexico
Gregory Ume, Papua – New Guinea
Bernhard Wyss, Switzerland

Other non-members that also contributed to the Committee's activities:
Matthew Arndt, European Investment Bank
Paolo Ciccarelli, EuropeAid
Fabio Di Stéfano, UE Delegation in Côte d'Ivoire
Lydie Ehouman, African Development Bank
Anthony May, United Kingdom
Sanjivi Rajasingham, World Bank
Siélé Silué, World Bank
Monique Van Wortel, The Netherlands
Karen White, United States

1. WORK PROGRAMME AND ORGANISATION

1.1. Work programme

The PIARC Executive Committee decided that TC A.3 should deal with two main issues during the 2008-2011 cycle:

- Investigation of approaches to the economic evaluation of mobility pricing effects.
- The study of the approaches to methods of appraisal of social impacts resulting from road projects.

Concerning mobility pricing, TC A.3 agreed to look at:

- Road pricing schemes for which the primary goal is to finance the construction and/or maintenance of road networks, as well as pricing schemes (also) used as traffic-management and/or environmental-protection tool.
- Single road as well as area or region wide charging schemes.
- Urban and inter-urban road-user charging schemes.
- Already implemented schemes and schemes under consideration or planned for implementation.

Pricing effects to look at should typically include congestion (travel time and travel reliability), reduction of air pollution and green house gases emissions, noise, accidents, modal shift (in particular the use of public transport) or deterred trips (in time and space), economic development, land use, and equity issues. Attitudes towards charging should also be considered.

With regard to approaches to evaluation of social impacts of road projects, the study would address appraisal methods (ex-ante) as well as evaluation methods (ex-post), new and not necessarily new approaches, as well as systematic and non-systematic approaches. TC A.3 should look at the positive as well as the negative sides of social impacts. Social impacts to look at include any impact on, or perceived by, non road users (for example, those on accessibility, barrier effect, air pollution, climate change [CO_2, energy consumption], noise, other environmental related impacts, human health, employment, housing, local development/economy, or cost/price of transport.

1.2. Organisation

The results from the TC A.3 investigation and study have been gathered in two technical reports, one per issue.

All the TC A.3 members have been involved in the production of both technical reports, as well as in the other Committee's activities, although some of the members were obviously more active in one issue than in the other.

To organise and push the production of the technical reports, three members were appointed as leaders for each issue:

- Fannie Joubert (who had to leave the Committee in 2009), supported by Pascaline Cousin and Friedrich Schwarz-Herda; and
- Maxime Jebali, supported by Martin Pöcheim and Laurent Gnalin.

1.3. Committee meetings

The development of TC A.3's work benefited from seven Committee meetings, in Paris, Montreal, Budapest, Abidjan, Madrid, Querétaro and Singapore.

Whenever possible, the Committee meeting took place back to back with other national/international related events, or took advantage of special sessions arranged by the hosts. In this respect it is worth mentioning the following events organised in coordination with the Technical Committee meetings:

- Seminar on “Innover pour mieux financer les transports urbains“, Association québécoise du transport et des routes (Montreal, Québec, Canada, 11 November 2008).
- PIARC international seminar on “Implemented and Envisaged Road Toll Policies in Central and Eastern European Countries”, KKK (Budapest, Hungary, 6-7 May 2009).
- Special session on “Approaches to the appraisal of social impacts: Practices followed by International Funding Institutions”, Ministry of Economic Infrastructure (Abidjan, Côte d’Ivoire, 14 September 2009).
- Round Tables on “Improving the practice of cost-benefit analysis in transport” and “Highway pricing policy”, International Transport Forum, Instituto Mexicano del Transporte and Secretaría de Comunicaciones y Transportes (Querétaro, Mexico, 21-22 October 2010).

The first TC A.3 meeting in Paris, in April 2008, was the occasion for PIARC to explain its work procedures to the Committee. The Committee started the discussion of its work programme for the entire period 2008-2011, refined the topics to be addressed and the anticipated outputs and calendar, and assigned first responsibilities within the Committee.

TC A.3 members during the meeting in Paris (April 2008)

The second meeting was held in Montreal, in November 2008. Its goals were to review each country’s experience in terms of the two issues to be studied by TC A.3 and to complete the work programme for 2008-2011. At the end of the meeting, Transport Canada arranged a technical visit to the extension of highway 25, which links highway 440 to Henri-Bourassa Boulevard in Montreal, and includes a 1.2-km 6-lane toll bridge over the *Rivière des Prairies*.

TC A.3 members during the meeting in Montreal (November 2008)

Technical visit to highway 25, near Montreal (November 2008)

The third TC A.3 meeting took place in May 2009, in Budapest. Organised to coincide with the Committee's international seminar on 6 and 7 May, its goal was to press ahead with the implementation of the Committee’s work programme. More specifically, the meeting focused on the conclusion of the draft tables of contents of the two reports to be produced and on how to handle the process of data collection in order to draw up these reports.

TC A.3 members during the meeting in Budapest (May 2009)

The fourth meeting in Abidjan, in September 2009, allowed the Committee to continue gathering data to be used in its technical reports. It was an opportunity to meet several representatives from international funding institutions and deepen the Committee's knowledge about the approaches they follow when evaluating the social impacts of road projects. An additional objective was to agree upon the specific details of the Committee's second international seminar, to be organised in Bamako in the spring of 2010; unfortunately, this event could not take place finally. A technical visit was programmed at the end of the meeting, to provide members with a first-hand opportunity to learn more about the new highway section under construction Singrobo-Yamoussoukro, which is part of the *Autoroute du Nord*, an essential highway for the economic development of Côte d'Ivoire.

Visit to the new highway section under construction Singrobo-Yamoussoukro (September 2009)

The fifth Committee meeting in Madrid, in February 2010, was an opportunity to determine how much progress had been made in drafting the Committee's technical reports, and to agree on the modifications that needed to be made concerning their content.

TC A.3 members during the meeting in Madrid (February 2010)

In Querétaro, in October 2010, the Committee reviewed the status and the drafts of its technical reports. The Committee also started the preparatory work for the XXIVth World Road Congress in Mexico and selected the abstracts of its international call for individual papers.

The meeting in Queretaro coincided with the celebration of the Bicentenary of Mexico

The Committee held its last meeting in Singapore, in March 2011. During the meeting, the final draft reports were revised and the main conclusions discussed. The Committee also reviewed and took a final decision of the pre-selected individual papers and structured its technical session for the World Congress. The hosts also arranged a technical visit to the Electronic Road Pricing (ERP) Control Centre and some of the charging gates in the city.

Visit to the ERP Control Centre during the meeting in Singapore (March 2011)

2. PRODUCTIONS

2.1. Technical report “Worldwide situation of road pricing and assessment of its impacts”

The aim of this report is to review the approaches to the economic evaluation of road pricing effects. As already mentioned, pricing schemes to look at included road pricing schemes for which the main goal is to finance the construction and/or maintenance of road networks, as well as pricing schemes primarily used as traffic-management and/or as an environmental-protection tool. The study considered single road and area or region wide charging schemes, as well as urban and inter-urban road-user charging schemes.

The pricing effects that have been finally considered include impact on mobility patterns (traffic demand, traffic diversion, modal swift), on the environment (air quality, CO_2 emissions, noise), on accidents, on the economy, on accessibility and land use, and equity issues. Attitudes towards charging are also considered.

In order to produce the report, TC A.3 organised its work through the collection of information from several case studies. Each case study looked at the evaluations carried out before and/or after the implementation of an existing or envisaged pricing scheme. These case studies are presented in Appendix II of the report and cover pricing schemes at zone level as well as at network level, or even at international scale. For each case study, the reporter was requested to try to focus its research on the identification of (1) the effects that have been considered / analysed when the pricing scheme was evaluated, (2) the significance/magnitude of impacts, and (3) the evaluation methods/approaches used to determine said significance. The main findings from the analysis of those case studies are presented in chapter 3 of the report.

To facilitate identification and selection of case studies, the TC A.3 reviewed in advance the existing and envisaged pricing schemes worldwide. The results of this review in the countries represented in the Committee are summarised in Appendix I. The information provided basically deals with the type of scheme, its date of introduction, how it works, main benefits/results till now, problems encountered, and next steps; references for additional information have also been included. Some reflections on worldwide progress of road pricing in general, based on the material compiled, are presented in chapter 2.

The document is complemented with chapter 1, where TC A.3 includes some key notions considered useful for understanding the rest of the document, and concludes with chapter 4, where some final conclusions are summarised.

It is worth mentioning that this document has been prepared by the TC A.3 taking as a basis, as far as needed, the report produced in 2007 by PIARC Technical Committee 1.1 “Pricing as a financial and regulatory instrument for achieving equity”.

2.2. Technical report “Approaches to evaluation of social impacts of road projects”

The aim of this second study is to review the approaches to appraisal of social impacts resulting from road development and usage. From the very beginning, TC A.3 decided to focus its research on approaches at project level, rather than at network level, and not limit itself to ex-ante methods but look also at ex-post practices.

The distinction of which impacts had to be considered as “social impacts” was not evident. TC A.3 decided to “open” the scope of its review and look at any impact on, or perceived by, non-road users.

To accomplish its objective, TC A.3 decided to collect first information on the systematic approaches to ex-ante evaluation used by the countries represented in the Committee. At this stage, two different situations were made evident: on one hand, there exist some developed countries where innovative methods are being developed and implemented; on the other hand, the appraisal of social impacts in developing countries is basically done following the requirements and practices promoted by international funding institutions. This is the reason why the results from said review are summarised in two separate chapters, one with the overview of approaches to appraisal in developed countries (chapter 3.1) and another on financial backers practices (chapter 3.2). It is important to clarify that the review does not mainly address the outcome of social impact assessments but rather the appraisal methodology.

Together with the review of existing systematic approaches to ex-ante evaluation, the Committee followed a similar process to identify and describe ex-post evaluation practices amongst the Committee’s member countries. Chapter 3.3 documents the result of this work.

The main findings and conclusions coming from the analysis of all analysed practices and case studies are presented in chapter 4 of the report.

The document is finally complemented with chapters 1 and 2, where TC A.3 includes some introductory comments on the limits of traditional project assessment and the diversity, distribution and perception of social impacts in transport infrastructure projects.

2.3. International Seminar on “Implemented and Envisaged Road Toll Policies in Central and Eastern European Countries”

Under the auspices of TC A.3, the PIARC National Committee of Hungary and the Coordination Center for Transport Development of Hungary organised, in May 2009, in Budapest, a two-day PIARC international seminar on implemented and envisaged road toll policies in Central and Eastern European Countries. The main objective of the seminar was to disseminate among road transport professionals in those countries updated information on current road toll policy and strategy issues. A secondary objective was for TC A.3 members to gather information and improve their knowledge to facilitate the preparation of its report on this topic. This seminar was organised for representatives from both public and private sector interested in road infrastructure financing and operating issues.

The seminar comprised three plenary sessions where several case studies from different European countries were presented, followed by a half-day round table discussions and discussion with the floor. There was also a technical visit on the Hungarian nation-wide e-vignette user charge system. The plenary sessions provided presentations from international, regional and local experts as well as from the members of TC A.3.

Plenary session during the PIARC international seminar in Budapest on
"Implemented and Envisaged Road Toll Policies in Central and Eastern European Countries"

2.4. Special session on "Approaches to the appraisal of social impacts: Practices followed by International Funding Institutions"

The Ministry of Economic Infrastructure of Côte d'Ivoire and the Ivorian PIARC National Committee organised a half-day special session on the practices followed by some international funding institutions in the appraisal of road projects social impacts. The session took place on September 14th 2009, in Abidjan, linked to the third TC A.3 meeting. Delegates from the World Bank, the African Development Bank and the European Union presented to a wide group of African experts and to the Committee members the approaches they are introducing and promoting in developing countries to include the social dimension, during the assessment process of road projects.

Special session on "Approaches to the appraisal of social impacts:
Practices followed by International Funding Institutions" in Abidjan

2.5. Round Table on "Highway pricing policy"

A Round Table on Highway Pricing Policy was held in Querétaro (Mexico) on October 22, 2010. Its goal was to examine Mexico's highway pricing policy, as well as other countries' policies. The event was attended by 40 experts from around the world, such as several members of PIARC's Technical Committee, members of the Joint ITF and OECD Transport Research Centre, experts from North American and European universities as well as representatives from Mexico's public and private sector.

During the various sessions held, the different approaches used in highway pricing were analysed. The view taken by Mexico's public authority and highway operating licensee was explained. Also, Pascalin Cousin − as a member of the Committee − presented the experience of several European Union member states.

Other topics discussed included the following:

- Criteria used to update highway tolls in the CAPUFE network – The public authority point of view.
- Highway pricing policy and road infrastructure – The international experience.
- Highway pricing policy and road infrastructure – The Mexican experience.
- Price and income elasticity analysis in Mexican toll highways.
- Maximum toll versus maximum average toll – The Mexican experience: two case studies.

Round Table on "Highway pricing policy" in Querétaro

2.6. Article on "Road toll policies in Central and Eastern European countries", in Routes/Roads

This article – signed by Friedrich Schwarz-Herda, Adam Torok and Arpad G. Siposs - outlines some of the projects and experiences that were presented at the international seminar organised by TC A.3 in Budapest, and presents an overview of the current and future status of pricing as an instrument of financing and managing roads.

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TECHNICAL COMMITTEE A.4
RURAL ROAD SYSTEMS
AND ACCESSIBILITY TO RURAL AREAS

2008-2011 ACTIVITY REPORT

Contents

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

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Tiraogo Hervé OUEDRAOGO	Secretary, Burkina Faso
Eric SIKAM	Secretary, Papua-New Guinea
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Mohammad Al-HAZEMI	Saudi Arabia
Papa Modou, NDIAYE	Senegal
Jesus MERINO	Spain
Luis Alberto SOLIS VILLA	Spain
Peter O'NEILL	World Bank

Non-Committee Members:

Julio Cesar GAGO	Argentina
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1. TECHNICAL COMMITTEE TC A.4 RURAL ROADS SYSTEM AND ACCESSIBILITY TO RURAL AREAS 2008-2011

1.1 General Outlines

A significant number of developing countries from the different continents face the problem of the lack of roads in good conditions, generating an increase in transport costs and therefore, local and national economic growth is hindered.

Alternatively, public services are experiencing difficulties to provide a service to rural communities, particularly those regarding health and education, which brings along an incalculable cost for the human development.

It is worth mentioning that an efficient infrastructure has not yet been provided to a great portion of the rural population in the developing countries, which would improve accessibility and decrease isolation. The World Bank estimates that nearly 900 million rural inhabitants have no access to consistent transport.

The TC A.4, as a result of conjunct research and analysis, regards as a core aspect the importance of promoting a common methodology starting from the planning process, in which the principles and approaches for a participatory and multi-sectorial planning are set, considering that without an integrated approach of the transport and services infrastructure, the investments in transport are unlikely to offer economic and social benefits to the population, which is why it is necessary to include policies and strategies for rural roads in the national plans. In that context, 3 lines of action are proposed:

1.- In rural road planning, the aspects of sustainable maintenance must be at the top of the agenda in order to provide population with permanent and reliable accessibility.

2.- This sustainability will essentially depend on the opportune availability of the required funding, which is why it is necessary to adopt technical and financial methods, fiscally feasible with sustainable management.

3.- It is crucial that local communities take part in the complete cycle of the infrastructure projects. These local voices must be heeded in the planning, execution and also in the ownership and maintenance of their own roads.

1.2 Activities

- Seven TC A.4 meetings held in Bolivia, India, Norway, Italy, Romania, Mexico, and France from 2008 to the present, as well as the upcoming PIARC World Congress in September 2011

- Formulation of three working groups and production of working group reports:
  - Accessibility and planning of the development of rural roads system
  - Sustainability of rural road maintenance
  - Involvement of local communities in rural road maintenance

- Site visits of local engagement in rural road maintenance in:
  - Cancun, MEXICO in October 2008
  - Cluj Napoca, ROMANIA in April 2009
  - Hyderabad, INDIA in January 2010
  - Bergen, NORWAY in July 2010
  - Santa Cruz, BOLIVIA in March 2011
- An article on rural road connectivity in rural India

- Two seminars on rural road maintenance; one in Hyderabad, India in 2010, the other in Santa Cruz, Bolivia in 2011

2. WORK PROGRAMME AND ORGANIZATION

2.1 Meetings

	Date	Place	Summaries
1	April 8-9, 2008	Paris, FRANCE	13 members attended - Opening and introduction of technical committee - Presentation of appointments and leaders of each working group - Discussion on all the issues assigned to the technical committee working groups - Discussion on the Terms of Reference - Preliminary designation of organizational structures for each working group - Planning the next meeting
2	October 24-25, 2008	Cancun, MEXICO 	16 members attended - Opening with the Deputy Minister of Transport and Communication of Mexico - Presentation by Ms Ana Bravo of IFRTD of her organization's work - Working group organizational changes - Presentation of the progress made - Discussion of possible future seminars and the upcoming meeting
3	April 28-30, 2009	Cluj Napoca, ROMANIA 	15 members attended - Opening address of the technical committee - Presentation on local roads in Romania - Progress of the working groups - Presentation on the seminar that was to be held in January 2010 - Discussion of upcoming meeting - Site visit of a local community engaging

			with a contract to maintain a rural road
4	September 16-17, 2009	Milan, ITALY 	10 members attended - Opening remarks - Discussion of progress made by Working Group #1 and #2 - Presentation of the Hyderabad Conference - Summary of commitments made - Discussion of upcoming meeting and upcoming seminars
5	January 19-20, 2010	Hyderabad, INDIA 	7 members attended - Opening remarks - Review and discussion of progress to date - Promotion of the XXIV World Road Congress in Mexico in 2011 - Discussion on other topics and general information
6	July 1-3, 2010	Bergen, NORWAY 	8 members attended - Opening remarks and presentation on Norway's road system - Report on the meeting of chairs and secretaries of Strategic Theme A and the Hyderabad seminar - Progress on the work of sub-groups - Discussion of upcoming meeting
7	March 12, 2011	Santa Cruz, BOLIVIA 	7 members attended - Opening remarks and discussion on the three working groups reports and how they will be merged into one document - Status updates from each working group - Overview of key upcoming dates and deadlines

2.2 Strategic Concepts of the Work Groups.

The research work of the TC A.4 pursued as main objectives the successful experiences obtained in the countries of the different continents related to:

The sustainability in rural road maintenance where there was a participation of local communities.
The achievement of continuous budget funds supply for the maintenance, reconstruction and construction of rural roads.

Best practices in planning with the participation of the different sectors that have achieved alternate mobility solutions, different means of transport and infrastructure solutions; factors which have contributed to poverty reduction in rural areas with the subsequent improvement in their life quality.

In accordance with that, 3 work groups were formed, with their corresponding selected theme and strategy.

Coordination Structure:

1) Technical Committee steering members

- Chairman:

Denis ROSSMAN (South Africa) Until September 2009
Enrique León de la Barra (Mexico) from September 2009 to present

- Secretary (of each language):

French-speaking Secretary: Tiraogo Hervé OUEDRAOGO (Burkina Faso)
English-speaking Secretary: Eric SIKAM (Papua-New Guinea) Until October 2008
Acting English-speaking Secretary: Manon BARIL (Canada) from Oct. 2008 to present
Spanish-speaking Secretary: Enrique León DE LA BARRA (Mexico) until Sept. 2009.
Acting Spanish-speaking Secretary: Alondra CHAMORRO (Chile) from Oct. 2009 to present.

- WG leaders:

WG-1: Terje TESSEM (ILO)
WG-2: Enrique León DE LA BARRA (Mexico) until September 2009
WG-2: Manon BARIL (Canada) from September 2009 to present
WG-3: Amadé OUEDRAOGO until June 2010.
WG-3: Prabha Kant KATARE (India) from July 2010 to present.

The debates assigned to the committee cover the following three areas

Working group #1 “Accessibility and planning of the development of rural roads system

Issue A.4.1 ACCESSIBILITY AND PLANNING OF THE DEVELOPMENT OF RURAL ROADS SYSTEM	
STRATEGIES	OUTPUT
Investigate how the needs for accessibility and mobility in rural areas are being assessed and taken into consideration in planning the development of the rural roads system at national and or regional levels	Case studies, leading to a best practice guide

Working group #2 “Sustainability of maintenance”

Issue A.4.2 SUSTAINABILITY OF MAINTENANCE	
STRATEGIES	OUTPUT
Review of planning, financing and management of sustainable maintenance methods and approaches	Best practices for the sustainable maintenance of rural roads

Working group #3 “Involvement of local communities”

Issue A.4.3 INVOLVEMENT OF LOCAL COMMUNITIES	
STRATEGIES	OUTPUT
Consider how local communities should be involved in education, planning, financing managing and implementation of development and maintenance schemes	Case studies leading to best practices guide

- Working Group 1 (WG1)

Leader:	Terje TESSEM	ILO
Member:	Pasi PATRIKAINEN	Finland
	Georg HAUGER	Austria
	Peter O’NEILL	United Kingdom
	Olav ELLEVSET	Norway
	Gijs MOORS	Belgium

- Working Group 2 (WG2)

Leader:	Manon BARIL	Canada
Member:	Maurizio CRISPINO	Italy
	Losif Liviu BOTA	Romania
	Rinus JAARSMA	The Netherlands
Corresponding member		
	Alondra CHAMORRO	Chile
	José Alfonso BALBUENA CRUZ	México

- Working Group 3 (WG3)

Leader:	Prabha Kant KATARE	India
Member:	Tiraogo Hervé OUEDRAOGO	Burkina Faso
	Amadé OUEDRAOGO	Burkina Faso

3. FINAL REPORT SUMMARY

3.1 Accessibility and Planning of the Development of the Rural Road Network

The research on this area was carried out by the work group GT1 of the technical committee A.4 and was summarized in a guide document which discusses the following aspects:

- Examples of limitations in the provision of rural roads.
- General aspects of the planning.
- Planning framework.
- Planning tools.
- Recommendations to planners.

3.2 Sustainable Maintenance of Rural Roads

The development of this subtopic was assigned to the work group GT2 of the technical committee A.4. The result was a document called “A best practices guide for the sustainable maintenance of rural roads in developing countries.” It is based on literature revision, information obtained through research, seminars held in India and Bolivia, technical meetings and the experience of the technical committee. It discusses the following concepts.

- The importance of rural road maintenance.
- Sustainable maintenance practices for rural roads.
- Sustainable maintenance tools.
- Case study.
- Conclusions.

3.3 Participation of the local community in rural roads.

The compilation of the information and its analysis regarding the background and successful experiences concerning this subtopic was carried out by the work group GT3 of the technical committee A.4. Strategies, processes and development models were identified, in which the approach is to achieve the participation of the community from the very beginning of the planning and execution, as well as in the current ownership and maintenance of rural roads network, with the subsequent job generation. The content covers the following aspects.

- Background on community participation in the infrastructure.
- Need of the community participation and its scope.
- Factors that affect community participation and processes to obtain it.
- List of meaningful practices of community participation in rural roads.

4. INTERNATIONAL SEMINARS

4.1 International Seminar in Hyderabad, India; from the 19th to the 23 of January, 2010.

Several important figures participated in this event: Pradeep Jain 'Aditya', Minister of State for the rural development of India, E.S.L. Narasimhan, Andhra Pradesh State Governor, K. Rosaiah, Chief Minister of Andhra Pradesh, Jean-Francois-Corté, PIARC Secretary General, several high-ranking officials from India and members of the Technical Committee A.4.

The main topics that were analyzed and discussed during this seminar were focused mainly on the importance and meaning of the sustainable maintenance of rural roads as a key factor to preserve the road assets of the countries, and thus guaranteeing a permanent accessibility to rural areas, always with a forward-looking approach to increase the socioeconomic development of the most isolated communities.

4.2 International Seminar in Santa Cruz, Bolivia; from the 10th to 12th of March, 2011.

This event was organized and attended by the Bolivian Roads Administration and the Bolivian Engineering Society, S.C., the Minister of Public Works, Services and Housing of Bolivia, high-ranking officials of the local government and members of the Technical Committee A.4. The average attendance was 300 attendees in the seminar as well as the presentation of 18 speeches from 7 different countries: Bolivia, Chile, Spain, India, Mexico, Paraguay and Peru.

The main topics that were analyzed and discussed during this seminar were focused mainly on the sustainable maintenance of rural roads, showing successful experiences from the attending countries with the only purpose of preserving the road assets of the countries, and thus achieving a permanent and reliable accessibility to rural areas.

5. PUBLICATIONS

5.1. Routes / Roads

[Number] Routes/Roads No.346
[Title] Providing Connectivity to rural India.
[Authors] Prabha Kant Katare, Director (Projects), National Rural Roads Development Agency, India
[Summary] Extensive empirical research has substantiated that lack of connectivity and isolation is a primary cause of persistence of poverty in the rural areas. Connectivity opens up economic opportunities, facilitates mobility of people and products and enables rural households to Access public services. Thus, investment on rural roads is expected to stimulate agricultural growth, as well as, enhance livelihood opportunities for the rural poor, thereby reducing rural poverty.

5.2. Technical reports

The technical reports produced during this 2007-2011 work cycle are:
- Planning for Rural Accessibility and Mobility
- Sustainable maintenance of rural roads in developing countries
- Practices on Involvement of Local Community in Rural Roads

2. Collected case studies

Several papers about the sustainable maintenance of rural roads have been produced and collected on the occasion of the events organized by the Technical Committee, as shown in the following table.

PIARC/TC A.4	
Title	**Country**
2nd Committee Meeting in Mexico (October, 2008)	
International Forum for Rural Transport and Development	Peru

1st International Seminar in Hyderabad, India (January, 2010)	
The Indian perspective on asset creation and asset preservation	India
Integrated rural accessibility planning	Bangkok
Preservation of rural road infrastructure, issues and concerns	India
Poverty alleviation bye improving mobility	Bangladesh
Facility based planning of rural road network	India
Rational design criteria for sustainable rural roads.	India
Improved asset management-climbing out of the road sector pothole	USA
Key implementation issues	India
Maintenance of rural roads built under PMGSY in difficult areas	India
Mainstreaming labour based road maintenance & Asset management through community contracting and local Partnerships	Cambodia
Performance Based Maintenance Contract in Rural Roads	Nepal
Rural Road Pavement Performance Evaluation	India
Roads: The Role of Community Participation	India
Microenterprise-based routine road maintenance	Colombia
Understanding the diversity of rural transport needs to maximize community participation	Nepal
Community participation in development of rural roads	India
2nd International Seminar in Santa Cruz, Bolivia (March, 2011)	
The scope of the ecosystem approach in the implementation of development infrastructure.	Bolivia
Road Conservation Program with Microenterprises.	Bolivia
Roads to live to better	Mexico
Road Management Plan.	Paraguay
Bridge Maintenance.	Bolivia
Maintenance using high performance “Single Layer” Pavements	Bolivia
Use of Chlorides to Maintain Unpaved Roads	Chile
Road Construction plebiscite	Peru
Surface Treatment using gravel	Bolivia
Asphalt Technology for low-priced pavement	Bolivia
Socio-Economic Impact	India
Community Participation on Development of Rural Roads**.**	India
Reinforced Priming for the formation of road layers in rural roads	Argentina
Bituminous Surfacing in unpaved roads maintenance	Chile
Bituminous whitewash and micro blacktop in cold	Bolivia

STRATEGIC THEME B

IMPROVING PROVISION OF SERVICES

Keiichi Inoue (Japan), STB Coordinator

INTRODUCTION

The goal of STB, “Improving Provision of Services”, is to encourage the improvement of services provided to the community by improved operation of the road transport system, integration with other transport modes, good governance and a customer-oriented approach. STB is comprised of 5 technical committees (TC), and each TC has addressed 3 or 4 Issues, in various initiatives to achieve the STB goal**.**

TC B.1 (Good Governance of Road Administrations) has discussed the following issues.

- Best practices for good governance
- Improved services to customers
- Human resources for the future

In the above fields, this committee contributed to Routes/Roads, the quarterly magazine of the Association, with the publication of at least six articles. Moreover, a toolkit for anti-corruption was developed with the great effort, and it would be the effective tool for organizations to implement proactive measures for promoting institutional integrity.

The Association has put particular emphasis on technology transfer as its major mission, therefore international seminars and workshops are regarded as key opportunities to reflect needs from developing countries and counties in transition in their activities and to transfer effective technologies to such countries.TC B.1 organized two international seminars in Mali and Malaysia, which drew great attention from participants, especially from those from the host countries.

TC B.2 (**Road Network Operations)** has addressed various matters with the following issues, such as ways of operation and up-to-date technologies including intelligent transport system (ITS) to optimize the use of the available road space.

- Management of congested areas
- Appropriate use of ITS for an integrated system
- Management of road corridors

The committee revised the ITS Handbook, which will be the third edition of its series. Also, the committee set up a joint task force with FISITA, another organization outside PIARC, and held joint meetings and workshops under close mutual cooperation. As for contribution to Routes/Roads, two articles were published and at this moment, members of TC B.2 are playing a key role in editing feature articles in the field of ITS on No.351 edition, 3rd quarter of 2011. The above valuable knowledge and information was shared and discussed among members from all over the world through an international seminar in Malaysia and a workshop in South Africa.

As for congestions in urban areas, **TC B.3 (Improved Mobility in Urban Areas)** has mainly focused Issues, listed below.

- Integration of the different modes of transport
- Land use planning and road transport
- Non-motorized mobility

TC B.3 keenly examined several measures for congestions such as integration of the different modes of transport, the promotion of non-motorized mobility, the development of terminals and cooperation of land-use policy. And also, with great support of Chilean Highway Administration, they had a joint international seminar with TCB.4 in Chile.

TCB.4 (Freight Transport and Inter-Modality) has earnestly tackled efficiency, safety and sustainability, including association with other modes in the field of city logistics on the following issues.

- Management of strategic freight corridors
- Interfaces of freight transport on roads with other modes
- Urban Freight Management

They held two joint international seminars, one of which is organized with close cooperation with TC A.1 to reflect the view of the environment and sustainability, and the other is with TCB.3, as mentioned above.

TC B.5 (**Winter Service)** has the following four issues, and this committee paid attention to road operation in winter, based on the view that people in communities require constant access to the transport road networks through a whole year.

- Improve winter maintenance and operation information systems
- Provide sustainable winter maintenance
- Share knowledge via the Winter Road Congress
- Communication with road users

The committee examined technologies for information, operation, maintenances, communication with road users and road safety in adverse weather conditions. Also, members published “Snow and Ice data book 2010”, which was expanded upon the second edition in 2006, and which is a useful reference tool for those who are relevant to winter services. Moreover, TC B.5 members played a key role in the 13th Winter Road Congress in Quebec in February 2010, which made a great success thanks to their contributions, and we can find it on No.346 edition of the Routes/Roads. As for Routes/Roads, they had the central role in editing features articles on No.345, apart from the above one.

Also, STB organized 2 coordination meetings with the Strategic Theme Coordinator, the TC Chairs and the Secretaries. First meeting was held in Tokyo in July 2009 with the assistance of Japanese National Committee. At this meeting, participants shared and understood the progress of studies, and they coordinated overlapped matters and decided the direction of future works. Regarding the second meeting organized with the support of Finnish members in Helsinki in July 2010, it was a meaningful occasion to share information about the progress of studies and to discuss contents of Mexico Congress, ways of improvement regarding operation of TCs and the strategic plan of the next cycle.

At the Mexico Congress in this September, many tremendous works made by TCs will be introduced in the TC sessions, and the discussion will be greatly draw attentions. Also, some members of STB are going to contribute to the Strategic Direction Sessions and the Special Sessions of the Congress. I hope that this Congress will give fruitful results, and that effective technologies will be shared in people and agencies from all over the world, and then this will lead to the sustainable development of road and the goal of STB, “Improving Provision of Services”.

At last, I would like to take this opportunity to thank the members of the STB technical committees, all concerned for their hard works, and devoted activities for the past 4 years.

TECHNICAL COMMITTEE B1
GOOD GOVERNANCE OF ROAD ADMINISTRATIONS

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

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René Suter, Switzerland
Rex Toornvliet, Netherlands
Sanna Kolomainen, Finland
Soren Fogh, Denmark
Steven Green, United Kingdom
Tom Roelants, Belgium
Zoltan Toth, Hungary

1. THE WORK PROGRAMMES AND ORGANISATION

1.1. The work programmes

Each working group prepared a working programme at the beginning of the cycle. The working programmes were based on the terms of reference provided by the World Road Association Executive through their strategic plan.

Terms of reference TC B.1

Issue B.1.1 Best practices for good governance	
Strategies	***Outputs***
Review recent changes in successful governance structures, practices and auditing such as the introduction of performance measurement. Examine different plans, policies and initiatives for successfully ensuring institutional integrity in the road sector.	Report identifying the key aspects and success factors that contribute to good governance. Best practice advisory guide for the road sector.
Issue B.1.2 Improved services to customers	
Strategies	***Outputs***
Undertake a comparison of services targeted at customers and how customer's feedback is collected. Evaluate how a customer-oriented approach has improved services.	Benchmarking exercise comparing case studies and identifying common success factors.
Issue B.1.3 Human resources for the future	
Strategies	***Outputs***
Review countries plans, policies and strategies regarding skill shortages and human resource challenges for the future. Review what is being done within the road sector to make the sector appealing and what skills would be beneficial to bring into this sector. Consider solutions to needs expressed by developing countries relating to deficiencies in training and education systems which are resulting in a lack of appropriately qualified road industry professionals.	Report on the skills gap within the road sector now and those skills that will be required in ten years' time. Identification of best approaches to improve the supply of skills. Training for those in the sector and those entering the sector.

The programmes evolved based on the technical committee members initial meetings and were influenced by change of memberships within the working groups. All the working programmes have been approved by the World Road Association Executive after adjustment and feedback. The following tables summarise the work programme of each working group. The tables with orange headers are the original working programmes as approved by the World Road Association at the beginning of the cycle and the green header tables are the updated versions with our progress throughout the cycle.

Several changes can be observed from the original terms of reference or work programme. For example, due to 2008/2009 global financial crisis, some committee members faced budget restrictions and were not able to travel any more, some active members moved to corresponding members. Committee members left through workplace changes or retirement and the working programmes had to be revised according to the resources available. It was also impractical for a working group to conduct a skills gap analysis in road administrations without a significant budget allocated to the project. These resource impacts reduced the scope of some of the terms of reference, but were determined in consultation with the World Road Association.

Working Group 1 working programmes

Issue B.1.1: Best practices for good governance - ORIGINAL		
Description of the selected strategies	Identifying existing governance practice of the Road Administration (RA). Develop insights under which conditions certain forms of governance can be efficient and effective. • Institutional Integrity: Institutional Integrity with focus on anti-corruption measures in the road sector. Benchmarks of integrity laws, policies and measures; Analysis of current situation and activity in the field of integrity against identified benchmarks, best practice case studies from road administrations in developed and developing, good practice guidance based on evaluation of case studies and transferable lessons • Project Integrity: project integrity with a focus on effective governance. Sample of actual project governance approaches through case study assessment applied in different countries and identify how they contribute to integrity at micro level within RAs. Assess and share designing the optimal project level approach that maximizes the possibility of reaching outcomes that are identified at project concept stage.	
Working group leader	Mr S. GREEN (UK)	
Cooperation within PIARC		
Cooperation with other organizations	OECD; Transparency International, World Bank.	
Outputs: Good practice case studies for good project governance in road infrastructure building projects • Good practice case studies and transferable lessons with regards to institutional integrity		**Calendar** Qrt 4 2010 Qrt 3 2010
Technical reports	A combination report linking each of the working group's reports to the Public Value Model.	Qrt 2 2011
Articles	An article describing preliminary results on maintaining integrity in projects An article describing the final results on integrity in projects (2010) An article on existing evidence and results on the institutional integrity survey (possible preliminary) An article on developing good practice – examples of anti corruption measures implemented in existing management systems	Qrt 1 2010 Qrt 2 2011 Qrt 1 2010 Qrt 1 2011
PIARC international seminars	Seminar in Mali	Qrt 4 2009
Session at XXIII World Road Congress	Mexico September 2011	Qrt 3 2011
Aspects more specifically relevant to developing countries and countries in transition Imposition of governance frameworks from international authorities (e.g.: World Bank, IMF)		

Issue B.1.1: Institutional Integrity and Good Governance - ACHIEVED	
Description of the selected strategies	• Investigate the topic of institutional integrity with focus on tackling corruption in the road sector, drawing on a range of literature, knowledge and experience of the group and primary data collection and analysis. • Propose a toolkit of potential measures for preventing, identifying and taking enforcement action against corrupt behaviour within Road Administrations
Working group leaders	Mr Jonathan SPEAR (UK) / Mr Alexander WALCHER (Austria)
Cooperation with other organizations	OECD; Transparency International, World Bank, ARMFA.

Outputs: Key definitions and understanding of the causes, costs and impacts of corruption in the road sector 1. Key definitions, terminology and review of literature 2. A survey of WRA members into their preparation of measures to tackle, corruption in the roads sector 3. Selected case studies of integrity/corruption 4. Conceptual model and "toolkit" of anti-corruption measures 5. Analysis of societal (macro) and project/programme (micro) implications of the model/toolkit 6. Final technical report providing an overall analysis and set of recommendations from the above		**Calendar** 1. December 2008 2. August 2009 3. December 2009 4. June 2010 5. Sept 2010 **6.** November 2010
Technical reports	A full technical report will be produced setting out the key definitions, causes and consequences of corruption in the roads sector, case studies, the conceptual model and toolkit and recommendations This will feed into the overall Report of the Technical Committee and the various outputs of the committee up to and beyond Mexico.	November 2010 November 2010 to January 2012
Articles (Routes/Roads)	Article 1 – Introduction to Institutional Integrity and Results of WRA Survey (Routes/Roads Vol.347) Article 2 – Conceptual Model and Toolkit for Tackling Corruption (Routes/Roads Vol.348)	July 2010 December 2010
WRA international seminars	Seminar in Bamako, Mali with a particular focus on discussing corruption in the developing world.	December 2009
Session at XXIII World Road Congress	Mexico – 28 September 2011 – Support for TC B1 Technical Session Special session SP8 (Good Governance)	September 2011
Aspects more specifically relevant to developing countries and countries in transition We expect this topic to be highly relevant to developing countries and countries in transition and issues pertinent to these instances will be discussed within the Working Group and also, crucially, at the Technical Seminar in Bamako, Mali.		

Working Group 2 working programmes

Issue B.1.2: Improved Service to Customers - ORIGINAL	
Description of the selected strategies	Undertake a comparison of how customer feedback is collected and how to interpret the results. Evaluate how a customer orientated approach can improve services: - customer expectations, considering the maturity of the road network. - how to educate customers, capture their input and then determine how that input is assessed and then utilized? - how countries segment their customers and the effectiveness of that segmentation?
Working group leader	Ms. Mara CAMPBELL (USA) / Ms. Agneta WARGASJO (Sweden)
Cooperation within PIARC	We plan to give all Technical Committees an overview and summary of what our Working Group is trying to achieve to better educate them with regards to our efforts.
Cooperation with other organizations	CEDR, AASHTO and TRB. In addition, other National bodies looking at customer orientation issues.

Outputs		**Calendar**
Technical reports	Report highlighting how customer feedback is collected and the results of that feedback is interpreted. Report identifying important elements including key aspects, success factors and pitfalls, when implementing customer orientation.	4th Qrt 2009 2nd Qrt 2011
Articles	An article or case study for customer segmentation An article on the seminar in Mali	4th Qrt 2009 2nd Qrt 2010
PIARC international seminars	Seminar in Mali	4th Qrt 2009
Aspects more specifically relevant to developing countries and countries in transition We intended to investigate if the identified key elements of customer orientation are applicable to developing countries or countries in transition. We also intend to provide recommendations to developing countries and countries in transition regarding customer orientation and its impact on public value and improved services.		

Issue B.1.2: Improved Services to Customers - ACHIEVED		
Description of the selected strategies	• Undertake a comparison of services targeted at customers and how customer's feedback is collected. • Evaluate how a customer-oriented approach has improved services.	
Working group leader	Mara CAMPBELL (USA) / Agneta WARGSJO (Sweden)	
Cooperation within WRA	B 2: Road Network Operations; B 5 Winter services; C 2 Safer Road Operations	
Cooperation with other organisations	CEDR, AASHTO, TRB, OECD, International Transportation Forum	
Outputs: • A summary report of four (4) case studies of how different countries identify and segment customers • Knowledge sharing report on good examples of methods targeting how to capture customer needs and an evaluation of the methodology used • A summary report of four (4) case studies of how to manage customer orientation and internalise customer orientation within a Road Administration. • Report identifying important elements including key aspects, success factors and pit falls, when implementing customer orientation		**Calendar** May 2008 Nov 2009 May 2010 Nov 2010
Technical reports	Report highlighting how customer feedback is collected and the results of that feedback is interpreted. Report identifying important elements including key aspects, success factors and pitfalls, when implementing customer orientation.	
Articles	'Understanding and Incorporating Customer Needs' – Routes/Roads Vol.345	Qrt 1 2010
WRA international seminars	Seminar in Kuala Lumpur – April 2011 Joint Seminar with TC B.2 (ITS Seminar: Customer Orientation in the Context of ITS)	
Sessions at XXIV World Road Congress	Mexico – 28 September 2011 – Support for TC B1 Technical Session No special session has been scheduled	September 2011
Other events	Global governance and policy events – Winter Congress in 2010	Qrt 1 2010

Aspects more specifically relevant to developing countries and countries in transition

We investigated if the identified key elements of customer orientation are applicable to developing countries or countries in transition. We will provide recommendations to developing countries and countries in transition regarding customer orientation and its impact on public value and improved services.

Working Group 3 working programmes

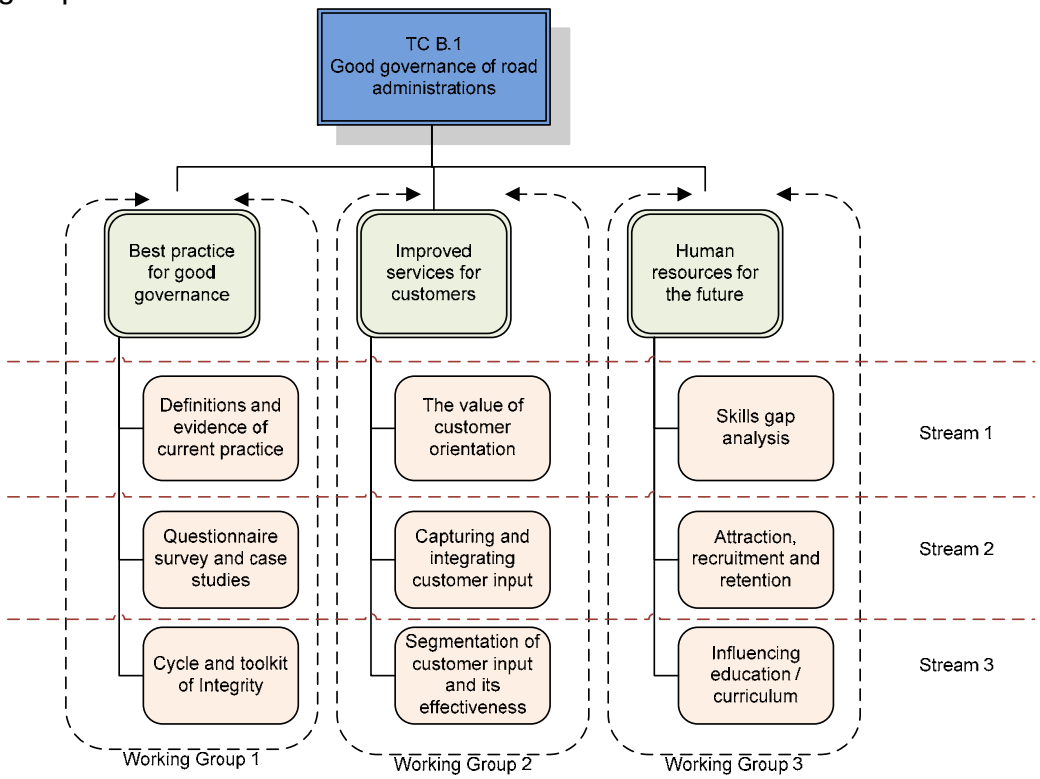
Issue B.1.3: Human Resources for the Future – ORIGINAL		
Description of the selected strategies	• Review countries strategies regarding skill shortages and human resource challenges for the future. • Review what is being done within the road sector to make the sector appealing and what skills would be beneficial to bring into this sector. • Consider solutions to needs expressed by developing countries relating to deficiencies in training and education systems, which are resulting in a lack of appropriately qualified road industry professionals. • To identify the extent of the labour market gap and assessing analysis methodologies that can be used by other countries. • Core competencies analysis may identify what human resources capabilities are required and ways of acquiring them.	
Working group leader	Mr. Brendan NUGENT (Australia) / Ms. Heidi HARPER (South Africa)	
Cooperation within PIARC		
Cooperation with other organizations	OECD and other National bodies looking at developing capability of capacity.	
Outputs:		**Calendar**
Technical reports	A combination report linking each of the working group's reports to the Public Value Model.	2nd Qrt 2011
Articles	An article or case study for skills attraction/retention An article on the seminar in Mali	2nd Qrt 2009 2nd Qrt 2010
PIARC international seminars	Seminar in Mali in Qrt 4 2009	4th Qrt 2009
Other events		
Aspects more specifically relevant to developing countries and countries in transition Curriculum - Consider solutions to needs expressed by developing countries relating to deficiencies in training and education systems. Also consider whether the trends (in some developed countries) away from students selecting maths and science subject has causal or evolutionary trends that could help identify issues in transition/developing countries earlier.		

Issue B.1.3 : Human Resources Management - ACHIEVED	
Description of the selected strategies	• Review countries plans, policies and strategies regarding skill shortages and human resource challenges for the future. • Review what is being done within the road sector to make the sector appealing and what skills would be beneficial to bring into this sector. • Consider solutions to needs expressed by developing countries relating to deficiencies in training and education systems which are resulting in a lack of appropriately qualified road industry professionals.
Working group leader	Mr Brendan NUGENT (Australia) / Ms Heidi HARPER (South Africa)
Cooperation within WRA	Strategic theme meetings in Tokyo and Helsinki Transportation Association of Canada Annual Conference (Halifax, Canada – September 2010) – Presentations on "HR for the Future" and "Good Governance for Road Administrations"
Cooperation with other organizations	OECD and other National bodies looking at developing capability of capacity.

Outputs: Develop case studies/best practice for • Current and future skills gap analyses in the roads sector • Attraction, recruitment and retention of the best people with the right skills for the roads sector. • Strategies to increase the pool of skills, particularly through influencing curricula		**Calendar** Nov 2009 May 2010 Nov 2010
Technical reports	A combination report linking each of the working group's reports to the Public Value Model.	Qrt 2 2011
Articles	Article 1 - A case study for skills attraction/retention (Routes/Roads Vol.344) Article 2 - An article on the seminar in Mali (Routes/Roads Vol.346)	Qrt 2 2009 Qrt 2 2010
WRA international seminars	Seminar in Mali in December 2009	Qrt 4 2009
Session at XXIII World Road Congress	Mexico – 28 September 2011 – Support for TC B1 Technical Session Special Sessions SP7 and SP8 on Tuesday 27 September	Qrt 3 2011
Other events	International Road Federation World Meeting (Lisbon, Portugal – May 2010) Transportation Association of Canada Annual Conference (Halifax, Canada – September 2010) – Presentations on "HR for the Future" and "Good Governance for Road Administrations"	Qrt 2 2010 Qrt 3 2010
Aspects more specifically relevant to developing countries and countries in transition Curriculum - Considered solutions to needs expressed by developing countries relating to deficiencies in training and education systems. Also considered whether the trends (in some developed countries) away from students selecting maths and science subject has causal or evolutionary trends that could help identify issues in transition/developing countries earlier.		

1.2. The organisation

In order to deliver the expected outcomes, the technical committee B.1 was divided in working groups who worked on streams as shown on the below chart.



2. PRODUCTIONS

2.1. Articles in Routes/Roads

- No. 344: ‘Attracting a new generation to the roads sector in Australia and New Zealand’
- No. 345: ‘Understanding and Incorporating Customer Needs’
- No.346: ‘Summary paper on the PIARC International seminar entitled “Human Resources Management, Governance and Public Procurement”’
- No. 347: ‘Institutional integrity, a survey of current practice in the road sector’
- No. 349: ‘Cycle of integrity and toolkit of anti-corruption measures’.

2.2. WRA International Seminars

- International seminar in Bamako, Mali in December 2009: ‘Human Resources Management, Governance and Public Procurement’
- International seminar in Kuala Lumpur, Malaysia in April 2011 (co-hosted with TC B.2): ‘Roads and highways: optimising services for the customer’

2.3. WRA Winter Congress

- Global governance and policy events (customer orientation) – Winter Congress in 2010

2.4. Related international events

- Presentation on ‘Human Resources for the Future’ issues at the International Road Federation World Meeting (Lisbon, Portugal – May 2010)
- Transportation Association of Canada Annual Conference (Halifax, Canada – September 2010) – Presentations on ‘Human Resources for the Future’ and ‘Good Governance for Road Administrations’

2.5. Technical Committee Reports: (all to be published in 2011)

- ‘Overview report’ - (Main methods and findings of TC B.1)
- ‘Best Practice for Good Governance – Institutional Integrity’
- ‘Improved Services for Customers’
- ‘Mind the Gap! Human Resources for the Future’

2.6. Surveys

- ’Customer segmentation’
  From: TC B.1.2, Improved services for customers.
  Content: Customer segmentation, methods to collect customer input, and utilisation of customer input within the road administration.
  Language: English
  Timeline: April 1, 2010 - May 15, 2010.
  The survey was distributed to all of the TC B.1 members and the results will be incorporated into the final report.

- ‘Organisation Integrity - Principles, policies and practices related to preventing, identifying and tackling corruption.’
  From: TC B.1.1, Best Practices for Good Governance.
  Content: Reasons for corruption; legal and regulatory frameworks; analysis of the management systems; prevention of corruption; enforcement of anti-corruption measures; whistleblower system and whistleblower protection systems; and future developments.
  Language: English and French
  Timeline: survey circulated between April - July 2009. Analysis and results completed in December 2009
  Survey distributed to TCB1 members.
  Findings will be included in the TC B1 report (in addition to the Routes/Roads article published earlier this year)

- Engagement survey to identify people in organisations who specialised in certain aspects of HR
  From: TC B.1.3, Human Resources for the Future
  Content: Requesting contacts in certain aspects of HR including Attraction, Recruitment, and Retention / Developing people / Industry involvement / Liaising with the education system / Technical knowledge management / Corporate strategic planning
  Language: English and French
  Timeline: October 2008.
  Survey distributed to TCB.1 members.

2.7. TC meetings

The technical committee B.1 met on several occasions during the cycle 2008-2011:

- Paris, France April 2008
- Amsterdam, Netherlands July 2008
- Sydney, Australia November 2008
- Malmo, Sweden June 2009
- Bamako, Mali December 2009 (joint with TC B.1 seminar)
- Lisbon, Portugal June 2010
- Cape Town, South Africa November 2010
- Kuala Lumpur, Malaysia April 2011 (joint with TC B.1 and TC B.2 seminar)
- Mexico City, Mexico September 2011

The minutes of these meetings can be seen on the World Road Association members’ area website.

TECHNICAL COMMITTEE B2
ROAD NETWORK OPERATION

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Mrs. Gail	BESTER	South Africa
Mr. Fritz	BUSCH	Germany
Mr. Phil	LAWES	Australia
Mr. Markus	MEISSNER	Austria
Mr. Ir Dirk	THIBAU	Belgium
Mrs Caroline	POURTOIS	Belgium
Mr. Geert	DE RYCKE	Belgium
Mr. Eric	LABRIE	Canada
Mrs Susan	SPENCER	Canada
Mrs Anne	BARIL	Canada - Québec
Mrs Lise	FILION	Canada - Québec
Mr. José Miguel	ORTEGA JULIO	Chile
Ms. Wei	YAO	China
Mr David	LUIZ FERNANDEZ	Spain
Mr Robert E.	ARNOLD	USA
Mrs Shelley	ROW	USA
Mrs Valerie	BRIGGS	USA
Mr Randell	IWASAKI	USA
Mr. Petteri	PORTAANKORVA	Finland
Mr. Kari	KESKI-LUOPA	Finland
Mr. Mike	NOBLETT	USA (representing FISITA)
Mr. Jacques	BOUSSUGE	France
Mme Isabelle	DUSSUTOUR	France
Mr. Martial	CHEVREUIL	France
Mr. Guy	LE COZ	France
Mr. Patrick	LEFEBVRE	France
Mr. Alexis	BACELAR	France
Mr. Evangelos	VISKOS	Greece
Mr. Aristophanis	PAPADIMITRIOU	Greece
Dr. Agnes	LINDENBACH	Hungary
Mr. Tamas	TOMASCHEK	Hungary
Mr. Gursharan	SINGH GILL	India
Mr. Asadollah	NAJAFI	Iran
Mrs Ilaria	COPPA	Italy
Mr. Hideto	HATAKENAKA	Japan
Mr. Takayuki	OBA	Japan
Mrs. Nik Airina	NIK JAFFAR	Malaysia
Mr. Ismail	bin MD. SALLEH	Malaysia
Mr. Mustapha	CHIKHI	Morocco
Mr. Juan Othon	MORENO NAVARRETE	Mexico
Mr. Jorge Artemio	ACHA DAZA	Mexico
Mr. Joao	COUTO	Portugal
Mr. Mircea	NICOLAU	Romania
Mr. Bogdan	TUDOR	Romania
Mr. Aurelian	GRIGORESCU	Romania
Dr. John C.	MILES	United Kingdom
Mr. Robert K.	CONE	United Kingdom
Mr. Richard	HARRIS	United Kingdom
Ms. Mari-Louise	LUNDGREN	Sweden
Mr. Erwin	WIELAND	Switzerland

1. THE WORK PROGRAMME IN BRIEF

The Road Network Operations technical committee's work falls under Strategic Theme B: Improving Provision of Services. This theme's overarching goal is to encourage the improvement of transportation services through enhanced operation of the road system, integration with other transportation modes, good governance, and a customer oriented approach.

The following issues and strategies were allocated to the Technical Committee B2 on Road Network Operation in 2008:

1.1. B.2.1 Management of Congested Areas

Examine successful approaches to managing traffic flow on major urban and interurban roads in congested areas, and produce a study of the factors affecting efficient use of road space on major urban and interurban roads. Recommendations to network operators for successful management of congested areas, and develop a toolbox of strategies for tackling congestion. Includes Traffic Control Centres benchmarking

1.2. B.2.2 - Appropriate use of ITS for an integrated transport system

Prepare an overview of current V2I (Vehicle to Infrastructure communication) and CVHS (Cooperative Vehicle Highway Systems) developments and initiatives, future products and services with recommendation to PIARC and FISITA. In order to reach this objective, a task force (PIARC sub-committee) convened within the context of the PIARC / FISITA MoU involving the motor industry and the road authorities has been launched to develop recommendations for the deployment of roads infrastructure to support cooperative systems

Revision of the World Road Association ITS Handbook: the plan was to make the 2nd edition available on-line in English and French, using the basis of the network operation website

1.3. B.2.3 - Management of road corridors

Identify the factors affecting corridor usage, and how to influence users. Address the cross-border issues: integration of services across country borders.

2. ORGANISATION OF THE WORK

The committee has organized its work in accordance with the issues to be studied and created the following sub-groups:

B2.1: management of congested areas, leader Robert ARNOLD (USA), co-leader Phil LAWES (Australia),

B2.2, split into 2 subgroups:

- B2.2.1: the PIARC FISITA Joint task Force (JTF), leader Robert CONE (UK) , co-leader Mike NOBLETT (US) and then Russ SHIELD (US) with Ian DICKIE (FISITA)

- B2.2.2: up-dating the ITS handbook, leader John MILES (UK), co-leader Valerie BRIGGS (US)

B2.3: Management of road corridors, leader Susan SPENCER (Canada), co-leader Caroline POURTOIS (Belgium).

Due to the similarity of objectives, B2.1 and B2.3 have developed a common approach based on the collection of best practises around the world. This has been achieved using a survey in order to identify relevant case studies. 57 case studies from 17 countries have been collected and analysed.

2.1. B2.1 and B2.3 common approach

The B2.1 workgroup examined the understanding of and successful approaches to managing traffic flow on major urban and interurban roads in congested areas. It analysed case studies of successful (and unsuccessful) approaches to managing traffic flow on major urban and interurban roads in congested areas and drew recommendations that are presented in the TC B2 Technical Report.

Similarly, the B2.3 group examined the various factors contributing to successful management of different types of road corridors. Given that congestion in its various forms is the primary challenge facing road corridor managers, many of the tools related to corridor management are the same as those for management of congested areas.

The recommendations are detailed in the TC B2 technical report and have been classified in the following categories:

- **REDUCING NON-RECURRING CONGESTION**

  Traffic Incident Management
  - Develop and adopt a unified goal for incident response.
  - Develop comprehensive guidance on incident response performance measures that local and/or regional stakeholders can use to assess incident response programs.
  - Universal first responder training should focus more on traffic incident response.

  Planned Special Events
  - Develop cross jurisdictional/agency traffic management plan
  - Manage travel for a planned special event so that economic and tourism benefits are targeted to the hosting community.
  - “Showcase” a successful planned special event could lead to increased future tourism.

  Work-Zone Management
  - Shorten the contract time; particularly phases that impinge on traffic.
  - Improve communication with motorists
  - Adopt a coordinated policy, planning, and programming approach to work zone planning and operations
  - Design for future maintenance

Real Time Information

- Incorporate the principle of traveller information into agency and corporate mission(s).
- Increase the delivery of travel/journey time information systems. Deployment might need to be phased depending on research and technologies.
- Establish data standards
- Design serviceability into display signs
- Sign spacing is critical in providing sufficient time for users to react yet being economical to deploy.
- Travel time information is particularly useful when there are multiple routes/mode choices available to users.
- Providing multiple information paths will increase the usefulness.-

- **REDUCING RECURRING CONGESTION**

Congestion Pricing

- Variable rates best for congestion reduction; fixed rates are perceived as pure tolling or revenue generation only.
- Tie revenue to roadway improvement or alternative transportation mode
- Provide extensive public outreach prior implementation
- Use technology to minimize back office overhead, collection, and enforcement costs

Arterial Management & Traffic Signal Timing

- Provide cross-jurisdictional management/signal coordination
- Investigate the use of adaptive control systems
- Establish a well defined procurement process for equipment

Planning for Physical Capacity Expansion

- Tie roadway performance to budget and project selection processes
- Implement bottleneck reduction program
- Explore non-physical capacity expansion (operational) strategies concurrently with physical capacity expansion options.
- Design for future maintenance

Managed Lanes

- To accommodate future changes in operational strategies design flexibility into the physical facility, the dynamic signing infrastructure, and the monitoring capabilities.
- Managed lanes are justifiable beyond the peak commuting periods (recurring congestion) as it can be used to address non-recurring congestion such as that caused by a crash or other emergency situations.
- Integrity of the managed lane approach relies on establishing and maintaining the legislation, policies, interagency agreements, procedures, protocols, control plans, intelligent transportation systems (ITS), and support services (such as enforcement and traffic incident management) required to sustain day-today operation.
- Although managed lane strategies that use road pricing (also see Congestion Pricing) can generate revenue, they should not be confused with toll facilities. Linking any excess revenue to improving the facilities performance or funding alternative modes (i.e. mass transit service) should be objectives of the strategy.

Encouraging alternative modes

- Link road pricing revenue to build new or expand/improve existing systems in the corridor
- Encourage citizens to use mass transit solutions
  - Implement incentives for employers (tax, rebates, etc) to subsidize mass transit fees for employees
  - Reward carpooling through reduced tolls, special lanes (HOV), assigned / free parking, etc
  - Outreach program to promote the positive benefits and combat the negative perceptions of public transportation
  - Provide real time performance, scheduling, and route information tools for mass transit services
  - Establish cashless – interoperable fare system
  - Provide clean and safe system; including loading/unloading areas and the access to them.
- Establish reliable trip times through special bus lanes or priority access to HOV lanes

2.2. The Joint Task Force

The objective of JTF was to deliver a policy document (the JTF report) aimed at policymakers, directors and senior managers in Roads Administrations, the auto industry and other associated organisations. The findings will be presented to the engineering and academic communities through an outreach programme and at each of the FISITA and PIARC World Congress. The ultimate goal of the JTF is to present its findings at the PIARC the World Congress in Mexico in September 2011 and the FISITA world congresses which occur every two years, the FISITA congress took place in Budapest in May 2010, the next one will be in Beijing in 2012.

Most of the early work of the task force was focussed on the production of an outline of the final report and a supporting questionnaire aimed at gathering intelligence from the joint community. The questionnaire was comprehensive but long, complex and designed to guide one-to one conversations or discussions in small groups and workshops.

Because of the diverse nature of the Joint Task Force it has been difficult to arrange full meetings, but met at different occasions, benefiting from TC meetings or various other events such as the ITS World Congresses (see next Chapter).
It was agreed that communications would be approved by setting up a website based on the facilities available to the Technishe Universitat Munchen (TUM). An offer of support from BMW was accepted which enabled Task Force members to attend events, undertake workshops and promote the work of the task force in both the Automotive and Road Operator communities.

In addition, a Google group has been set up to promote communications between task force members. This group allows all to communicate by email or access the conversations by threads on the Google group website. It allows members a convenient way of promoting events of interest, activities undertaken or changes made to the content of the website. The group is closed to members.

2.3. The ITS Handbook

Predecessors to the current Network Operations Technical Committee recognised the need for guidance on ITS that is geared to the needs of transport professionals who are interested in adopting ITS-based methods and services in their cities, for their inter-urban highways, long-distance corridors and rural regions. In response they prepared the PIARC *Intelligent Transport Systems Handbook*, drawing on the technical committee members' experiences of ITS deployment from around the world. It was first published in 1999 and in a revised English language edition in 2004. Very quickly it was recognised as a much-needed authoritative introduction to the subject and there have been translations published in French (2005), Chinese (2007) and Spanish (2010).

The *ITS Handbook* is now used as a reference text by some universities and as the basis for training seminars and professional development in a number of countries, including to students and professionals in countries with economies in transition. It presents a catalogue of solutions, with practical examples illustrating through case studies how ITS can be implemented. However, B2 committee has been made aware of two significant issues with the handbook:

1. There is a need to keep the handbook current and up-to-date by drawing on continuing experience of ITS deployment, for example some of the case studies identified by the B2.1 and B2.3 subgroups.
2. The high cost of purchasing printed copies of the handbook or subscribing to the on-line version is a barrier to its use for training purposes, especially for undergraduate courses and professionals in developing countries.

B2 committee has responded by taking advantage of the expiry of the marketing agreement made in 2004 with the publishers of the English-language version. The committee resolved to take on the task of making the *ITS Handbook* freely available on-line over the Internet, without subscription of charge so that the material can be accessed and downloaded by anybody, anywhere.

Through a contract let by the US Department of Transportation behalf of B2 Committee the full text of the *ITS Handbook* is being imported into the Road Network Operations website and organised in a way that will permit easy down-loading and local printing by the user. This work has been supervised by an editorial team formed with some committee members under the direction of John Miles and Valerie Briggs.

The ITS Handbook will sit alongside the companion *Road Network Operations Handbook* published by PIARC in 2003 which is also available on-line for free download from the Network Operations web site. Together, they provide resource material related to traffic management, incident management, and traffic operations and to provide safe and efficient services to all road users. The handbooks also provide guidelines on the implementation of ITS technologies and services for congestion management and corridor management in an integrated transportation system.

The outcome of this project will be an updated and expanded PIARC Road Network Operations website in English and French that will allow interested parties to access, download, or print the *ITS Handbook* and the *Road Network Operations Handbook* by individual section or by subsections.

Visit **http://road-network-operations.piarc.org/**

3. TC MEETINGS

The Technical Committee B2 met 9 times during the cycle:

- Paris (France), 15 – 16 April 2008
- Munich (Germany), 14 – 16 September 2008
- Washington (USA), 8-9 January 2009
- Rome (Italy), 7-8 May 2009
- Stockholm (Sweden), 18 – 19 September 2009
- Budapest (Hungary), 28-29 May 2010
- Montreal (Canada-Québec), 4-5 October 2010
- Kuala-Lumpur (Malaysia), 27-28 April 2011
- Lyon (France), 9-10 June 2011

In addition to these meetings, the Chairman participated in the two Strategic Committee Meetings, together with the members of the organising country:

- Tokyo (Japan), 8-10 July 2009
- Helsinki (Finland), 8-9 July 2010

Concerning the ITS handbook revision, the editorial team organised several meetings during the full technical committee or independently through phone/web conferences or physically (Washington, 28 January 2011).

4. THE JTF MEETINGS

The JTF meetings:

- Munich (Germany), 14 September 2008, kick-off meeting
- New York (USA), 19 November 2008
- Washington D.C., 10 January 2009
- Detroit (USA), 22 April 2009
- Munich (Germany), 2 July 2009
- Stockholm (Sweden), 19 September 2009
- Budapest (Hungary), 2 June 2010

5. INTERNATIONAL SEMINAR

The Technical Committee B2 has organised jointly with the Technical Committee B1 (Good governance of road administrations) an international seminar in Kuala-Lumpur (25-27 April 2011).

Topics of the seminar:

- Efficient customer oriented services
- Implementation of Congestion Management Strategies in Emerging Jurisdictions with focus on**:**
  - Develop Performance Measures
  - Institute System Performance Monitoring Plan
  - Identify and Evaluate Strategies
  - Implement Selected Strategies and Manage Transportation System

6. PARTICIPATION IN OTHER EVENTS

The Technical Committee participated in various international events, with the objective of promoting PIARC activities and collecting relevant information for the committee workplan:

ITS master class at the e-transport conference (Johannesburg, South Africa, March 2009): presentation of ITS and PIARC TC B2 activities.

PIECE 2010 conference (Kuala-Lumpur, Malaysia, April 2010), 2 workshops:
- ITS Tools for Road Network Management, Now and in the Future
- Special workshop on connected vehicles

Special PIARC sessions at FISITA congresses
- Munich 2008,
- Budapest 2010

The Second ETSI TC ITS Workshop, February 2010

The Fully Networked Car Workshop: the JTF chair was invited to present a paper at this workshop organised by the ITU at the Geneva motor show in March 2010.

ITS World Congresses (participation)

New York 2008, PIARC/FISITA Executive Session “Cooperative Systems”

Stockholm 2009, World Bank Special Interest Session “How to support ITS deployment in developing countries”

Stockholm 2009, PIARC/FISITA Special Interest Session “Cooperative vehicle-highway systems: towards convergence between the automotive industry and road operators”

Busan 2010, PIARC/FISITA Special Session “Benefits of Co-operative Systems”: Expectations from infrastructure operators”

EasyWay, participation of TC B2 Chairman at the EU Parliament lunch debate on the European ITS action plan 14 October 2009.

FISITA World Automotive Summit 15-16 July 2009, Frankfurt, Germany: John Miles facilitated a half-day workshop on road network management on behalf of TC B2

EasyWay Conference, Vienna November 2009: Presentation of PIARC and TC B2 activities by John Miles

International Summit on the State of the Connected Vehicle (hosted by the Connected Vehicle Trade Association and the Michigan Department of Transportation in conjunction with SAE International): John Miles made presentations on behalf of JTF at both the first summit 16-17 April 2009 held at Detroit, Michigan; and the second summit 29-30September 2010 held at Troy, Michigan

FISITA World Automotive Summit 4-5 November 2010, Mainz, Germany: Richard Harris presented on “Vehicle Safety Communications – Cooperative Systems Saving Lives”

AQTR Conference “Intelligent mobility: Let’s capitalize on ITS” Presentations by Martial Chevreuil, Richard Harris and Robert Cone, 6th October 2010, Montréal, Quebec, Canada

World Road Association UK Committee Annual Conference “A Global Challenge. Presentations by Richard Harris, Martial Chevreuil and John Miles, Birmingham, UK, November 2010

International Road Federation Second Middle East Regional Conference, Abu Dhabi, United Arab Emirates. Richard Harris presented “Intelligent Cooperative Vehicles & eSafety in Europe” November 2010.
CVIS training as part of the Clermont-Ferrand Summer School on Cooperative systems – concepts, benefits and deployment of “Talking” cars and roadside infrastructure, Presentation by Richard Harris “Cooperative systems and transport policy – making the case for cooperative systems” Clermont-Ferrand, France, September 2009

Intellect Transport Group Conference “An international Perspective”, Richard Harris presented “The World Road Association and ITS”, May 2009, London, UK

Institute of Highways and Transportation East Anglia Branch Meeting. Richard Harris presented “The work of the World Road Association (PIARC)” and “The World Road Association (PIARC) Technical Committee on Network Operations and its Workplan 2008-2011”, Ipswich, UK

7. PAPERS IN ROUTES/ROADS;

No. 341 “The PIARC-FISITA Joint Task Force on Intelligent Cooperative Vehicle Highway Systems”, Richard Harris and Martin Rowell
No. 348: “The Development of Intelligent Transport Systems in China through Public-Private Partnerships” John Miles and Wei Yao
No. 351: Special Issue on ITS

8. BIBLIOGRAPHICAL REFERENCES

- TC B2 Technical Report (September 2011)
- JTF report (September 2011)

TECHNICAL COMMITTEE B3
IMPROVED MOBILITY IN URBAN AREAS

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Valentin Anton, Romania
Anne Bernard-Gély, France
Bystrik Bezak, Republic of Slovakia
Manfred Boltze, Germany
André Broto, France
Martin Buck, Switzerland
Amadou Cissé, Mali
Giovanni Corona, Italy
Anita Curnow, Australia
Carlos Descalzi Pennacchiotti, Chile
Marc Ellenberg, France
Tomonori Higashi, Japan
Petri Jalasto, Finland
Farshid Kamali, United Kingdom
Lajos Kisgyorgy, Hungary
Geramisos Koklas, Greece
Emese Mako, Hungary
Martin McKay, Canada
Naohiko Hanabusa, Japan
Takumi Nishimura, Japan
Sungho Oh, Korea
Cecilia Olague, Mexico
Soledad Perez-Galdos, Spain
Hubert Peigne, France
Rita Piirainen, Finland
Alfredo Sanchez, Spain
Torbjorn Suneson, Sweden
Michel Veilleux, Canada-Quebec
Takashi Yajima, Japan

1. INTRODUCTION TO TCB.3

1.1. Context

TCB.3 is in the Strategic Theme “B” focused on Improved Provision of Services. The goal of this theme is to encourage the improvement of services provided to the community by improved operation of the road transport system, integration with other transport modes, good governance and a customer-oriented approach.

The specific topic of TCB.3 is “Improved Mobility in Urban Areas” and it focuses on three different strategies for improving urban mobility, namely:

- Integration of the different modes of transport,
- Land use planning and road transport
- Non-motorized mobility

1.2. Office-bearers

The group's chair is Hubert PEIGNÉ (France), and the three secretaries are:

- English-speaking Secretary: Anita CURNOW (Australia)
- French-speaking Secretary: Marc ELLENBERG (France)
- Spanish-speaking Secretary: Cecilia OLAGUE CABALLERO (Mexico)

The three working group convenors are:

- Working Group 1 – Manfred BOLTZE (Germany)
- Working Group 2 – André BROTO (France)
- Working Group 3 – Emese MAKO (Hungary)

2. WORK PROGRAMME AND ORGANISATION

2.1. Plenary Meetings

There have been seven plenary meetings held over the course of the four-year term, as follows, with the number of members attending shown in brackets:
April 2008: Paris (26)
October 2008: Budapest (24)
March 2009: Seoul (18)
November 2009: Madrid (20)
June 2010: Paris (15)
November 2010: Bucharest (15)
April 2011: Santiago (8)

The plenary meetings have also included working group meetings. In addition, two working groups arranged an additional meeting, as outlined in the individual working group reports below.

At the plenary meetings, the hosts organised technical tours, as follows:

Budapest – visit to the M0 Ring Motorway office and site, with a presentation on the procurement of this private road, including the methodology used to validate vehicle counts for the purpose of making payments.

Seoul – visit to the TOPIS centre which provided great insight into the integrated organisation of road traffic and bus services. The group also visited a pedestrian zone and stream in the city's heart that has relatively recently been reclaimed from roadway and is a very successful urban transformation project.

Madrid – presentation on the concession roads (which are subject to shadow tolls) in Spain, and a visit to the Madrid Metro control centre, including a presentation on the history of the development of the Madrid Metro very rapidly in recent years.

Paris – visit to the City of Paris traffic control centre which enabled the group to see the traffic control system adopted, and discuss the recent improvements that had been made to the system.

Bucharest – visit to the Bucharest traffic control centre, which had recently been delivered by a private company, and was now operated by them. New adaptive traffic signal control systems had been installed, locally developed, and were providing significant improvements in congestion management. The integration of bus and tram services to the system was a current challenge.

Santiago – visit with seminar attendees – see the seminar report in chapter 3.

2.2. Strategic Theme B Meeting Participation

There were also two Strategic Theme B meetings held during the course of the four years, the first on was in Tokyo in July 2009, attended by the chair (Hubert Peigne) and English and French speaking secretaries (Anita Curnow and Marc Ellenberg), while the second in Helsinki in July 2010 was attended by the chair (Hubert Peigne), the French speaking secretary (Marc Ellenberg) and Working Group 2 convenor André Broto.

2.3. Working Group 1

Working Group 1, Integration of the different modes of transport, is convened by Manfred Boltze from Germany. Mr Boltze was unable to continue formally in this role in the last year of the technical committee due to personal circumstances. Other working group members ensured the work continued during this time. The report contributions were coordinated by Anita Curnow at this time.

The working group held no additional meetings to the plenary sessions, choosing to work by correspondence in between formal meetings.

The key contributors to the working group's outputs were:

Manfred Boltze, Germany
Martin Buck, Switzerland
Amadou Cissé, Mali
Giovanni Corona, Italy
Anita Curnow, Australia
Carlos Descalzi Pennacchiotti, Chile
Lajos Kisgyorgy, Hungary
Takumi Nishimura, Japan
Sungho Oh, Korea
Alfredo Sanchez, Spain
Michel Veilleux, Canada-Quebec

The working group started by determining at its first meeting definitions for the terms that were to be used throughout the term, to ensure consistent definitions would be used.

The group then reviewed some work undertaken by Manfred Boltze and others at the Darmstadt University of Technology on congestion management[1]. It provided a good framework for the urban mobility work, although it is recognised that additional content in the area of the role of balancing the share of modes in mobility management was required. The work gave a good framework for defining the two main types of strategies identified; namely, demand- and supply-side strategies. This then formed the reference for the identification of strategies, types of actions, and actions.

The working group prepared a glossary of the types of actions at its fifth meeting, and also mapped these types of actions against strategies.

Case studies were identified by group members that fitted into one or more of the strategies identified, and a questionnaire/template prepared. Where members were familiar with the city, the template was prepared directly. Questionnaires were used where data gathering was required as a first step before filling in the template, to be appended to the final report. There were some case studies identified that were city-wide strategies, drawing upon a large number of the individual strategies.

Finally, also drawing on the abstracts submitted for the World Congress session on Keeping Cities Moving, the Introductory Report was prepared, and followed by the final report (which at the time of preparing this Activity Report is still under preparation).

Working Group 1 also reviewed 18 abstracts for the World Congress, of which seven were provided as full papers for review. The working group will participate in the Technical Session 12 – Keeping Cities Moving, as well as participating in Special Session 4 – Large cities: integration of the surface transportation modes. Material from the group's work, from case studies and from submitted papers will be reported at these sessions.

2.4. Working Group 2

The key contributors of working group 2 on "land use planning and road transport" were:

- Rita Piirainen Finland
- Cecilia Olague Mexico
- Soledad Perez-Galdos Spain
- Takashi Yajima Japan
- Martin McKay Canada
- Valentin Anton Romania
- Torbjorn Suneson Sweden
- Andre Broto France

Andre Broto was the leader.

The sub group had a separate meeting in Paris (25 and 26 of March 2010) in addition to meetings held in conjunction with the plenary sessions.

The first meeting was devoted to finalising the scope of the studies (investigate transport requirements and policies associated with planning of new developments in large cities – by reviewing case studies leading to guidance for road administrations for countries in a wide range of stages of development) and it was decided to take a longer-term outlook (future infrastructure development) and on areas outside of the core city.

It was also decided to focus on case studies related to cities well known by the group members and to collect data concerning the main factors impacting mobility within the suburbs both regarding the needs for transportation and the offer, namely:

- Population and employment sprawl,
- Density and pattern of transportation infrastructure (radial vs isotropic),
- Accessibility to transportation infrastructure,
- Capacity of transportation modes,

Finally, using nine case studies, the working group investigated the relationship between the density (population and employment) transportation modes networks, and mobility results. The case studies were:

- Tokyo Metropolitan Region,
- Paris Region,
- Madrid Region,
- Mexico City,
- Grand Toronto,
- Stockholm Region,
- Bucharest,
- Helsinki Region,
- Chihuahua.

Each group member produced a case study and the case studies were compared to find common points or specific results.

The group discussed the results and the key findings. Some members were asked to focus on what seemed to be good practices such as the relationship between land planning and transportation planning in Tokyo or Bus-VAO lanes in Madrid.

Some results were summarised in the introductory report and some key findings were presented in the seminar held in Santiago de Chile in April 2011.

Working Group 2 also reviewed 9 abstracts and 7 full papers for the World Congress. The working group will participate in Technical Session 12 (Keeping Cities Moving) and in Special Session 6 Transport and Land Use Planning (the topic is the relationship between urbanisation and use of the different surface transport modes), with the following presentations:

- Introductory presentation presenting the comparative analysis made by the group on different large cities;
- Three case studies for the illustration of different aspects of the problem:
    - Tokyo
    - Paris
    - Madrid

The final report is still under preparation.

2.5. Working Group 3

Working Group 3, Non-motorized Transport, is convened by Emese Mako from Hungary.

The working group held a meeting in Bratislava 11-13 April 2010 in addition to meetings associated with the plenary sessions. Significant work was also completed between formal meetings.

The key contributors to the working group's outputs were:

Emese Mako, Hungary
Bystrik Bezak, Republic of Slovakia
Marc Ellenberg, France
Takumi Nishimura, Japan
Hubert Peigne, France

Working Group 3 undertook three different surveys. The first was general in nature, the second quantitative and the third qualitative.

Altogether, there were 41 answers from the corresponding cities. The working group analysed the results and identified some trends and features of successful schemes for walking and cycling. Where measures were comparable between cities, comparisons were made quantitatively, other comparisons were made qualitatively.

Some of the results of the working group were presented at the Santiago Seminar in April 2011, and were summarised in the Committee's Introductory Report. Final report preparation continues at the time of writing this Activity Report.

3. PRODUCTIONS

3.1. Publications

A paper was provided for the consideration of the Routes/Roads editor on the work of Darmstadt University of Technology on management of congestion, in 2009.

3.2. Seminars

Technical Committee B.3 conducted a seminar in Chile in April 2011 along with the Chilean National Highway Administration and the Ministry of Public Works. The seminar featured two streams of presentations, one relevant to TCB.3's topic area and the other to TCB.4 of Freight Transport and Intermodality.

From April 12 to the 15, eight members of PIARC Technical Committee B3 participated in a technical meeting and seminar in Santiago, Chile – *the International Seminar PIARC Chile 2011*.

On April 12, 2011, a technical meeting of Technical Committee B3 took place.

Over the course of two days (April 13 and April 14) more than 40 presentations in eight sessions were given focusing on the following topics concerning improved mobility in urban areas:

Urban Public Transport;
Traffic Management;
Management of Transit and Road Design;
Urban Concessions and Traffic Management;
Mobility and Transport Systems (Planning);
Mobility and Transport System II (Non-motorized Transport);
Cities, Transport of Goods and Inter-Modality I; and
Transport of Goods and Inter-Modality II.

Of special note were the presentations given by members of Technical Committee B3:

Duplex Project A86, Paris, France – André Broto
Urban Sprawl – André Broto
Sustainable Urban Mobility Schemes for the City of Chihuahua, Mexico – Cecilia Olague
Non-Motorized Mobility – Hubert Peigne/Marc Ellenberg
A Network Operating Plan for Melbourne – Anita Curnow

Over 300 delegates representing more than 10 different countries were present at this seminar.

On April 15, approximately six members participated in a technical tour of Santiago and Valparaíso, which also included seminar participants. The tour included the following:

- Visit to the UOCT (Unidad Operatdora Control de Transito), which is the Santiago traffic control centre, hosted by Claudia Llach.
- Costanera Norte Highway Concession (Toll Road)
- Curacaví weigh in motion station
- ZEAL (ZONA DE EXTENSIÓN DE ACTIVIDAD LOGÍSTICA) Extended Logistics Activity Zone) on the outskirts of Valparaíso
- Camino La Pólvora, Port Access Tunnel to access the Valparaíso Port (passes under the residential area and emerges in the port area)
- Port of Valparaíso
- Tour of the city, ending at Viña del Mar

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TECHNICAL COMMITTEE B4
FREIGHT TRANSPORT AND INTER MODALITY

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Chairman
Hans Silborn, Norway

Secretaries
Benoit Cayouette, Québec-Canada
Ester Fernandez Garcia-Obledo, Spain (2008)
Cecil Selness, United States (2008-2009)
Juan Carlos Espinosa Rescala, Mexico (2009-2011)
Timothy A. Henkel, United States (2011)

Working group 1: Management of strategic freight corridor
Don Hogben, Australia (leader)
Bernard Jacob, France
Benoit Cayouette, Québec-Canada
Ali Traore, Burkina Faso
Jozsef Palfalvi, Hungary
Richard Engstrom, Sweden
Pieter de Winne, Belgium
Carlos Santillan Doherty, Mexico
Florian Torchin, France (leader 2008)

Working group 2: Interfaces of freight transport on roads with other modes
Martin Ruesch, Switzerland (leader)
Mohammad Tayyaran, Canada
Balzs Farcas, Hungary
Juan Carlos Espinosa, Mexico
Jan Spousta, Czech Republic

Working group 3: Urban management
Eiichi Tanaguchi, Japan (leader)
Yoshikazu Imanishi, Japan
Wanda Debauche, Belgium
Rick Barber, (c) New Zealand
Hervé Levifve, France
Jonathan James, United Kingdom

1. THE WORK PROGRAM AND ORGANIZATION

1.1. Issues

The issues defined for the committee in the strategic plan 2008-2011 were:

- Issue B4.1: Management of strategic freight corridors
- Issue B4.2: Interfaces of freight transport on roads with other modes
- Issue B4.3: Urban freight management

1.2. Work program

The committee broke up into three working groups, each responsible for one issue mentioned above. The strategies and outputs for each working group were:

Working group B4.1:

- Strategies: On the basis of case studies (including cross-border issues) selected in both developed and developing countries, analyse the favourable or non-favourable conditions required for the seamless transit of freight. Identify the possible remedial measures.
- Outputs: Report presenting an analysis of these case studies, including recommendations for improving the management and operation of freight corridors.

Working group B4.2:

- Strategies: From case studies involving different kinds of transport modes, review the aspects in the design and operation of interfaces which assist or are detrimental to the efficient and sustainable intermodal transport of freight.
- Outputs: Analysis of the case studies and recommendations for improving the efficiency of intermodal interfaces of freight transport.

Working group B4.3:

- Strategies: On the basis of case studies selected in both developed and developing countries, analyze the management of incoming freight and distribution of goods in congested urban areas. Focus on outcomes and evaluations of urban freight management schemes.
- Outputs: Report presenting an analysis of these case studies, including recommendations for how to implement sustainable and efficient freight management schemes in congested urban areas to reach the required effects.

The leaders for and members of each working group are presented above under the head line “Committee members having contributed to the activities”.

For the three issues mentioned above and to meet the objectives of each work plan associated, the committee developed a questionnaire that was sent to each member and corresponding members. The questionnaire surveyed best practices in each country. Answers were received from Australia, Belgium, Burkina Faso, Czech Republic, Finland, Sweden, Norway, Québec-Canada, United States, Japan, Switzerland, and France. Complementary documents were also received from international and regional organisations.

1.3. Committee meetings

The committee held regular meetings each year in spring and autumn in different countries. The meeting minutes have been drafted in English and French (and Spanish for some of them) after each committee meeting and are available on the PIARC Website. In each meeting, the work plan was discussed and progress was made. A lot of time during the committee meetings was reserved for working group meetings.

The committee meeting schedule was:

2008: Paris, April 15-16
Brussels, October 13-14

2009: Melbourne, March 30-31 and Wellington, April 1-2
Timisoara, September 15 (jointly with PIARC Seminar)

2010: Oslo, April 26-28
Manchester, October 19-21

2011: Santiago, April 11-12 (jointly with PIARC Seminar)

The working groups have had several telephone conferences between the committee meetings.

During the meetings there have been national presentations in addition to the committee discussions. These presentations are available at the committee Extranet.

1.4. Extranet

The committee Extranet, managed by the French Secretary, was used as a tool for the work program of the committee, gut also as a communication mechanism and to set the presentations and all documents useful for the progress of the committee. The Extranet has been organized into the following sections:

- Membership list
- Terms of reference
- Chair correspondence
- Secretary correspondence (general/more specific information)
- Meetings and seminars (meetings and seminars coordinates, agenda, minutes and presentations)
- Working groups (members, working plan, working papers, documents and papers form other organisms related to the committee work, case studies, report, appendices, etc)
    1. Management of strategic freight corridors
    2. Interfaces of freight transport on roads with other modes
    3. Urban freight management

1.5. Terminology

Martin Ruesch, Switzerland, has been the committee liaison member with the PIARC “Terminology Committee” and contributed to update the terminology database.

2. THE PRODUCTIONS

2.1. Publications

The committee will publish three reports in 2011:

1. Management of strategic freight corridors
2. Intermodal freight terminals – challenges and good practice
3. Public sector governance over urban freight transport

The report “Management of strategic freight corridors” includes policies and measures for safety, regulation and enforcement as well as infrastructure measures for important international freight corridors. The conclusions and recommendations are based on about 20 case studies from all continents.

The report “Intermodal freight terminals” addresses terminal infrastructure planning and design, operation and management, environmental aspects, land use and community acceptance and finally institutional and financial issues. The conclusions and recommendations are based on about 15 case studies, mainly from Europe, Asia and North America.

The report “Public sector governance over urban freight transport” includes about 15 case studies from different continents and network simulations of Japanese cases. Focus is on implementation and evaluation of case studies, and the report includes guidelines for implementing urban freight management.

2.2. Articles

The committee did not publish any articles in Routes/Roads during this cycle.

2.3. Seminars

The committee has been a joint organizer of two seminars during the cycle:

- Together with TCA.1 “Environment and sustainable transport”, September 16-18, 2009 in Timisoara, Romania (in cooperation with the Professional Association of Roads and Bridges from Romania and the National Company of Motorways and National Roads of Romania)
- Together with TCB.3 “Improved mobility in urban areas, and freight transport and intermodality”, April 13-14, Santiago, Chile (in cooperation with PIARC Chile, the Highway Administration Chile, Ministry of Transportation Chile and Ministry of Public Works Chile)

The theme of the seminar organized in Romania in September 2009 was “Environment and sustainable transport”. The seminar focussed on the impact of transportation on the environment and sustainable development, including intermodality. The invitation, agenda and presentations are available at PIARCs website. Our committee members made the following presentations:

- Romania: Romanian transport infrastructure, David SUCIU & Petru HORVATH
- Romania: Analysis of transport network – traffic demand models, Anca BRANZEREA, Simona MANEA, Petru HORVATH
- Romania: Development of logistic plan David SICIU, Andreea RADUCU, Petru HORVATH
- Québec – Canada: A green shift in Transportation: an American perspective, Benoit CAYOUETTE
- France & Switzerland: A green shift in transportation : an European perspective, Martin RUESCH, Wanda DEBUSHE, Bernard JACOB
- Japan: A green shift in transportation : the Japanese perspective, Eiichi TANAGUCHI

The seminar organized in Chile in April 2011 focussed on both improved mobility in urban areas and freight transport and intermodality. The proceedings will be available at PIARCs web site. Our committee members made the following presentations:

- Trends in freight transport and intermodality, Hans Silborn, Norway
- Urban freight management, guidance for implementation, Yoshikazu Imanishi, Japan
- Challenges for international freight flows through cities at borders, Juan Carlos Espinosa Rescala, Mexico
- Intermodal transport and urban areas, Martin Ruesch, Switzerland

- High productivity trucks as part of a urban freight strategy, Don Hogben, Australia
- Street space allocation for urban freight transport and delivery – examples from Europe, Wanda Debauche, Belgium

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TECHNICAL COMMITTEE B5
WINTER SERVICE

2008 – 2011 ACTIVITY REPORT

SUMMARY

The winter road environment is rapidly changing, climate change notwithstanding. Snow, ice, freezing rain, blowing snow, and avalanches continue to severely impact many of the world's roads, regardless of the anticipated changes to the climate. The weather impacts are not going to go away, even if the degree to which they affect roads varies from year to year. So what is the change all about? What is most rapidly changing today is the way in which we operate and maintain our roads. Drivers' expectations, traffic volumes, resource levels, information technology and knowledge of our climate continue to evolve and continue to influence the actions we take to effectively, efficiently and sustainably move people and goods.

A study of winter service management systems (WSMS) and road user information

The development of Road Weather Information Systems (RWIS) and Next Generation RWIS (XRWIS) paved the way for more integrated and complex winter service decision making tools. WSMS and other similar systems use the data utilised by RWIS and the decision making process of XRWIS and combines these with other information sources and technologies such as data logging, national forecast information and Highway Authority protocols to provide treatment recommendations, decisions on when to action, improved information dissemination and post storm reporting facility. These capabilities of WSMS make for an integrated and holistic decision support system, and are currently the most advanced form of support for winter maintenance activities.
The varying rates of technological development amongst the component parts of a WSMS have taken time to establish a common echelon that can facilitate successful implementation. WSMS, MDSS and other decision support systems have emerged as a result of developments in technology, realisation of potential for improvement and integration and experience in deployment of component systems. WSMS is the current worldwide best practice and is at the forefront of decision support for winter maintenance.

Communication with road users

The technical report has been elaborated to bring an overview of current practices in informing road users on road maintenance and specifically winter service at road networks in several countries. The aim of the report is to show the state-of-the-art of solutions used so far and to bring at least some applicable solutions which could be designated as best practices for future inspiration.
The report does not focus only on findings informing road users on general road maintenance proceeds but it deals also with the specific information distributed on winter service. Moreover, the report does not consider only the car drivers, but also other road users, such as cyclists, pedestrians and motorcyclists.

The questionnaire was structured into nine subtopics in order to get a description of specific aspects in the topic, such as use of different platforms for communication with road users on changeable traffic / weather conditions – ITS devices in vehicles, road-side systems, broadcasting of information and other elements contained in the wide topic.

Sustainable development and road winter service

A review of the main social, environmental and economic criteria taken into account within the winter road maintenance strategies and operation. It will also give some perspectives towards the development of a dedicated evaluation method in which sustainable parameters relevant to winter services are integrated.

Identify impacts of climate change on winter service and road infrastructure

It is necessary to work on the general tendencies that one perceives for the great climatic entities and to down scale the climate models to better understand the local operational impacts on winter service. It is also necessary to carry out an analysis of risks which will make it possible to propose tracks to define levels of service.

Snow and Ice Control Data Book – Edition 2010

Available and safe roads during the winter – demographic and climatic constraints – costs and benefits regarding safety, mobility, environment – human, material, equipment means – private partnership – decision support systems: these are the main parameters of today's "winter road maintenance equation". All included in the data book but each country uses its own set of methods to reach the goal.

COMMITTEE MEMBERS WHO HAVE CONTRIBUTED TO THE ACTIVITIES

B.5.1 **Improve winter maintenance and operation information**

Leader: Mr. Nelson, USA and Martin Hobbs, UK

Team: Dr. Hara, Japan
Mr Emery, Canada
Mr Karjalainen, Finland
Mr El Mounir, Morocco
Mr. Knudsen, Denmark
Mr. Olafsson, Iceland
Mr. Charpentier, Canada-Québec
Dr. Hanke, Germany
Mr Giannetti, Italy
Mr Chambers, UK
Dr Matsuzawa, Japan

B.5.2.1 **Provide sustainable winter maintenance**

Leader: Mr. Cocu, Belgium

Team: Mr. Lacis, Latvia
Mr. Jelisejevs, Latvia
Mr. Azcue, Spain
Mr. Lucas, Spain
Mr.del Pino, Spain
Ms. Gillardin, Switzerland
Mr Skerlan, Austria
Mr Giloppé, France

B.5.2.2 **Identify impacts of climate change on winter service and road infrastructure**

Leader: Mr. Marchetti, France
Team: Mr. Pans, Belgium,
Ms. Coudert, France
Mr. Giloppé, France
Mr. Tremblay, Canada
Mr. Christoglou, Greece
Mr. Barbas, Greece
Ms Öberg, Sweden
Mr Cerne, Slovenia
Mr Kim, South Korea
Mr Engmo, Norway

B.5.3 Sharing knowledge

Leader: Ms. Öberg
Team: The whole TC B5

B.5.4 Communications with road users

Leader: Mr. Männik, Estonia
Team: Mr. Ölander, Sweden
Mr. Sustr, Czech Republic
Ms Pliskova, Czech Republic
Mr. Rizzardo, Canada
Dr. Hara, Japan
Mr Garcia, Andorra
Assistants: Madelene Falk, Sweden,
David Palmitjavila, Josep Escaler and Rafael Cervos (all Andorra)

1 THE WORK PROGRAMME AND ORGANIZATION

Issue B.5.1 **Improve winter maintenance and operation information**	
Activities	***Outputs***
Investigate information systems, including two-way communications with road users Study of Winter Service Management Systems (WSMS)	Case studies of best practice in design and implementation of information/management systems
Issue B.5.2 **Provide sustainable winter maintenance**	
Activities	***Outputs***
Study of the full slate of social (safety), environmental and economic (cost-benefit) aspects required to achieve 'sustainability' in winter maintenance **5.2.1** Identify impacts of climate change (changes in winter severity) on winter services and on road infrastructure **5.2.2**	Identification of what optimum sustainability means in terms of winter maintenance, and strategies to achieve it. Report on the impact of climate change on winter service and propose actions as preventive measures.
Issue B.5.3 **Share knowledge via the Winter Road Congress**	
Activities	***Outputs***
Identify which priority issues and knowledge World Road Association members would find it useful to share, and in what format they would like to receive it.	Definition of the technical programme of the XIIIth World Road Association International Winter Road Congress in 2010 and production of the proceedings.
Issue B.5.4 **Communication with road users**	
Activities	***Outputs***
Identify innovative approaches to inform and influence road users about winter operations and safe winter driving.	Case studies illustrating best communication practice.

The challenges of the today's winter road service are the focus of TC B5's work resulting in the following reports on the State-of-the-Art.

1.1 A study of winter service management systems (WSMS) and road user information

Advancements in information/communication/remote sensing technologies combined with greater understanding of weather at the road surface have allowed winter service operations to become more advanced. The technology revolution has produced Intelligent Transportation System (ITS), global position system (GPS), automatic vehicle location (AVL), data acquisition directly from vehicles and personal communication options which are revolutionizing the way transportation agencies provide winter service and information to users. Road Weather Information Systems (RWIS) and advanced road weather models allow for the forecast of future road conditions and the development of Winter Service Maintenance Systems.

Winter Service Maintenance Systems (WSMS) are a developing technology currently implemented in some countries with marginal and cold winter weather climates. Numerous alternative systems can be utilised for aiding management of winter maintenance. Without an integrated holistic system such as WSMS, the use of disparate systems carries risk of data duplication, repetitive administration and consequential inefficiencies.

WSMS provide a central system, unifying the individual winter maintenance systems and offering the advantages of time and cost savings through simplification of data and decision making, and subsequently improving efficiency and effectiveness of winter maintenance.

Case studies from international Highways Authorities have provided an insight into some examples of best practice from countries including, Denmark, Japan, Lithuania, Sweden, Switzerland, Finland, and the U.S.A. These examples of best practice provide learning experiences to any Highway Authorities wanting to develop and implement a decision support system.

A literature review has identified amongst the case studies, varying types of WSMS utilised throughout the world, these varying between strategic and operational levels of winter maintenance and varying degrees of technicality and implementation. These differences exist due to the requirements of Highway Authorities dependent on the climate of their respective countries. WSMS is certainly not a one-fits-all system and different methods of procurement, either developed independently or bought ‘off the shelf’, are selected based on these identified needs and performance requirements.

This report informs on many systems available to Highway Authorities to aid in their duty of maintaining a serviceable road network. None, however, match the advanced and technically robust WSMS and systems of the same ilk. For countries requiring or aiming to achieve advancements in performance in routine winter maintenance, the next step forward and at the forefront of modern technology is WSMS.

The report includes the following chapters with case studies:

- introducing winter service management systems (WSMS)
- getting started: developing and implementing a WSMS
- sharing the data: WSMS and other management systems
- on the road: vehicle data collection
- taking it further: forecasting and modelling in WSMS
- getting the benefits: commercial and operational considerations

1.2 Sustainable development and road winter service

This effort consisted of two objectives, to: review the main social, environmental and economic aspects required to achieve 'sustainability' in winter maintenance, and review some relevant Sustainable Development assessment methods for the winter service.

Sustainable development is "universally" defined as follows: *Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs*[1]*.* Sustainable development is therefore looking for a continuous and dynamic equilibrium between a competitive economy, a social solidarity and an environmental protection, the so called "3 pillars" or "3 dimensions" which interface strongly with each other.

The technical committee B5 decided to give special attention to such an objective because on one side, this concept is "in vogue," getting more weight in public and private enterprises and institutions, and on the other side, because of the expectation that the different actors, directly or indirectly concerned by the winter service activities, could highly benefit from a global and multi criteria approach such as the one considered here.

The consequent objective of the committee was therefore to analyse how that concept can be translated concretely to the winter service activities.

The TC.B5 session will review the main social, environmental and economic criteria taken into account within the winter road maintenance strategies and operation. It will also give some perspectives towards the development of a dedicated evaluation method in which sustainable parameters relevant to winter services are integrated.

The report includes the following parts:

- Introduction, presentation of objectives, steps and methodology
- Analyse theoretical and practical elements for the development of a decision support methodology for winter service, integrating the elements of sustainable development
- Propose a basis for the future development of a dedicated methodology by defining sustainable objectives, indicators (or criteria) and parameters relevant to winter service activities
- Perspectives and future work
- Conclusion

[1] World Commission on Environment and Development (1987). Brundtland report "Our common future".

1.3 Identify impacts of climate change on winter service and road infrastructure

The following topics will be covered:

- Climate change:
    - Observations in countries around the world
    - Forecasts (days of snow, snow cover, days below and across 0°C
    - Expected impacts on winter maintenance (short term, long term)
- Impacts on winter maintenance:
    - Literature review
    - Impacts on de-icers consumption and use
    - Impacts on manpower (training, renewal)
    - Impacts on costs (investments, repairs, maintenance policies, contracts)
    - Specific case of urban areas, remote areas
- Impacts on infrastructures:
    - Literature review
    - Freeze/thaw cycles. Frost dimensioning
    - Extreme climatic parameters (temperatures, wind, avalanches)
    - Longer construction season. Materials characteristics
    - Environmental compliance of the infrastructure
    - Conventional and routine maintenance- sewage systems
- Conclusion

There are already thoughts and actions pertaining to climatic drift within the PIARC and in many other organizations or working groups. Models have been developed on both global and more reduced scales (IPCC), and the first work of analysis of the existing studies is to assess this modelling work.

The general principle of the study is:

- To know the current climatic conditions starting from the identification and of the quantification of the winter phenomena in various climatic zones.
- To know the type of winter service generated in these zones because of these climatic conditions.
- To have one (or more) model of climatic evolution sufficiently fine so that the winter phenomena perceptible are identified and quantified or to make relevant assumptions on the evolution of the winter phenomena deduced from this or these models.
- To deduce from these evolutions of the winter phenomena the evolution of the practices of winter service.

It is necessary to work on the general tendencies that one perceives for the great climatic entities and down scale them to more reduced areas that relate to winter service operations. It is also necessary to carry out an analysis of risks which will make it possible to propose tracks to define levels of service.

Other work conducted under this effort includes the following:

- Conducting a literature review of on the impacts of the climatic changes on the Winter Service.
- Illustrating the relation of the impacts of the climatic changes on the Winter Service.
- Identifying certain important parameters of the climatic changes (temperature, precipitation, etc.).
- Dividing into areas with similar climate.
- Identifying, for each geographical area, the tendencies of the climatic parameters.
- Deducing a level from probability for each impact in each geographical surface, and
- Making an analysis of the consequences of the climate change for each area on resources (cost, organization, road infrastructure, etc).

1.4 Communication with road users

Purpose: Identify innovative approaches to inform and influence road users about road condition, winter operations and safe winter driving.

Working Group B5.4 "Communication with road users" has prepared a questionnaire and sent it to members of TC B5. The idea was to compile an overview of different practices that captures how road administrations provide information of winter road and traffic conditions to regular road users and how the communication with travelers has been arranged. The questionnaire included 9 subtopics. Attention is focused to a highway user and not so much to an urban traveler. 24 filled questionnaires have been returned.

The subtopics follow:

1. Informing road users about the winter road and traffic conditions through mass media
2. Usage of on-road-installed devices for informing road users about changeable road/traffic conditions
3. Informing road users about changeable road/traffic conditions by devices installed into vehicle
4. Individual inquiries of road user in order to get information about winter road/traffic conditions
5. Feedback from road users concerning road/traffic conditions
6. Communication with road users during extraordinary winter road conditions
7. Road/traffic information aimed for winter pedestrians, cyclist, motorcyclists and motorists of ATV
8. Education of drivers and travellers to be active in inquiring of driving condition information
9. Interpretation of road/traffic information for foreigners

Subtopic 1 covers which organization that is responsible for collection of the traffic data and dissemination of the data to road users. Furthermore the channels by which the information about road and traffic conditions reaches the road users are described where Radio, TV and websites are common examples. All participating countries work with informing the road users and their answers to this questionnaire show that informing road users is one important task for each of the agencies. However, how the road user finds the accurate traffic information and how the road agency can guide their road user to get hold of the right information is a less discussed area with potential for improvement.

Teach your road user how to find the accurate traffic information
Thanks to the rapid development of traffic information systems and road weather information systems, road managers and service providers collect data that could assist road users. A task to be solved is how to make this information available to road users in a convenient way. A traveller should be taught how to acquire the prior information about the road and traffic conditions from a special website or from a Traffic Centre.

Today, the road user can get hold of changeable traffic conditions by devices installed into the vehicle which is something that almost all countries offer. What kind of information that is spread to the road user will be described in this chapter as well as which media that is most common for disseminate the information. The development of new technique and devices is rapidly occurring, which will provide new opportunities for information by devices which make this chapter to an interesting area.

Devices that send electronic messages are seen as more reliable than information from Traffic Centres. Sometimes during extreme road or weather conditions Traffic Centres are too busy for two-way communication and therefore sending electronic messages is more reliable. Therefore, for example, the RDM-TMC will probably become even more popular.

A website that provides the road user with the actual winter road condition is today a matter of course among all countries. However, the possibility of sending warning SMS by mobile phone is less common among the countries. This chapter describe the ordinary way of provide traffic information to road user through Web site and by telephone. Almost all of the countries that answered the question have a Public telephone number to Road/Traffic Information Centre.

Use the same Web site and telephone number for traffic information in all countries
All of the countries do have a Web site and a telephone number where the road user can get information today. One of the issues is that these Web sites and phone numbers often are long and complicated which makes them hard to remember. A recommendation is therefore to use short and memorable names for the sites and numbers such as 0200-2100 in Finland, 1510 in Estonia, 175 in Norway etc. A further recommendation is to strive for the having the same telephone number and Web sites in every country such as USA 511.

The feedback from road users concerning road-traffic conditions should be done by the most simple and effective way so that purpose of identified problems to be corrected quickly. In this sense, different countries use common methods such as road enquires, telephone enquiries, internet, booklets – questionnaires from service provider, and others.

The following findings were documented under this effort:

- Communication with road users during extraordinary winter conditions (snowstorm, ice rain, bad visibility, etc) in order to close or control entry of travellers into zone of winter emergency is done through: Police control and web, radio warnings, VMS, RDS-TMC, TV and SMS.
- Some countries/states warn bus companies and transport associations about adverse road conditions in order to avoid entry of heavy vehicles into winter traffic.
- Web sites are the most common way to inform them, followed by SMS and radio announcements.
- General information on walking and cycling conditions should be distributed, as this heavily influences users´ decisions for mode of transport.
- As the examples of national practices show, providing information on winter road service is not important only for car drivers, but also for vulnerable road users which use the same infrastructure into a large extent.
- Education of drivers and travellers to be active in inquiring of driving condition information had only four countries.
- No country has a mandatory program for new drivers for accessing road information, however in some countries, it is mandatory for people to take a winter driving training program to grant of drivers' licenses. Optional winter driving training programs are also available in various countries.
- More and more foreigners make their journeys in nation states, where they cannot understand the essential text on traffic boards which are exposed only in local language.
- In border crossings there is predominantly insufficient information for foreign travellers - no traffic centre number, no radio channel frequency, no traffic website address, no translation of text signs.
- Public road agencies should provide translation of essential roadside information, especially in border crossings, into widespread language in order to make them better understandable for foreigners.
- Cooperation between the neighbouring countries or states with intent to make the road information available along the through traffic route helps travelers to plan the trip and react in proper time.

1.5 Snow and Ice Control Data book – Edition 2010

Origins, Objectives and Methodology

A new updated Snow and Ice Data Book (3rd edition) was prepared for the XIIIth International Winter Road Congress, 2010 in Québec, Canada with 27 technical contributions. On the website a 28th is added.

Considering the usefulness of the first and second issue to support the exchanges of experiences between international experts in different countries, the PIARC Executive and the Winter Committee decided to pursue this initiative and stated that future efforts should be directed at documenting practices in additional countries.

The update includes:

Assessment of the Snow and Ice Control Measures

The cost and benefit of winter road maintenance activities is given prominence in the data book with summaries provided of measures introduced in recent years to minimise the use of de-icing materials. These include the measurement of efficiency both on an internal and external basis, and the use of performance indicators.

Traffic Safety and Road Users Information

A majority of countries highlighted the importance of sharing of information about road conditions with drivers, traffic information centres and various media organizations. Traffic (information) centres which operate 24 hours a day have been set up in a number of countries. They disseminate real time information to road users by various means including radio, websites and Variable Message Signs (VMS). VMS are used to give a range of information including in many cases road and air temperatures, road closures and recommended diversion routes, wind speed, weather forecasts and general road conditions. Reduced speed limits come into operation in some countries if the road is slippery or snow I present.

On-going Research and Studies

The reports illustrate that the latest technologies to continuously optimize winter maintenance operations are being tested by many countries by either improving the performance of the machinery or by developing the on-board equipment for vehicles involved in snow and ice control (integration of new technologies) but also through research into new spreading methods. Other major research involves the modernization and the improvement of the Road Weather Information Systems and pilot projects related to skid resistance measurement, road surface assessment, residual salt modelling and winter traffic problems.

Some administrations are exploring the idea of refocusing their role in the winter road maintenance process. For example, public-private partnerships are being considered as an alternative. Other countries which already contract with private companies to manage their road maintenance are developing their supervision and assessment methods.

1.6 Sharing Knowledge

1.6.1 Main conclusions from the PIARC XIIIth International Winter Road Congress 2010. Technical Programme Overview

135 accepted papers, most of them for oral presentations and others for poster sessions were accepted. Oral presenters were also given the opportunity to have a poster presentation to allow for deeper discussions. More than half of the oral presenters also wanted to take part in the poster session.

Topic 1 Winter Service Planning, Management and Implementation
6 sessions
- Overview of National Strategies and Policies (2 sessions)
- Winter Maintenance Managements Methods (2 sessions)
- Interaction Between Road Users and Agencies
- Challenges of Contracting

Topic 2 Safety and Mobility in Winter: Social, Environmental and Economic Aspects
4 sessions
- Accident and Traffic Flow Analyses
- Optimized Driver Information for Better Road Safety
- Special Traffic Problems and Solutions in Wintertime
- Sustainable Winter Maintenance in Road Tunnels

Topic 3 Winter Service Information Systems
6 sessions
- Monitoring and Observing Weather & Road Conditions
- Forecasting Weather & Road Conditions
- Decision Support Systems (2 sessions)
- Vehicle-based Technologies (2 sessions)

Topic 4 Snow and Ice Control Techniques and Technologies
7 sessions
- Innovative Techniques for Snow Removal (2 sessions)
- The Environment and Snow Control
- Techniques for the Application of De-icing Chemicals
- Measurement of Pavement Surface Condition
- Analysis of the Spread Rate of Chemical De-icers
- Prevention of Dealing with Snow/Ice

Topic 5 Winter Service and Sustainable Transportation
4 sessions
- Salt and the Road Right-of-Way
- Alternatives to Salt & Salt Quality
- Salt, Snow – Sustainable Options
- History of Maintenance in Various Countries

Topic 6 Winter Service and Climate Change Impacts
1 session

Some new aspects from previous years and reported in the Winter Road Congress 2010 will be highlighted. Some are quite new while others build on earlier results.

News since XII International Winter Road Congress.
The winter road environment is rapidly changing, climate change notwithstanding. Snow, ice, freezing rain, blowing snow, and avalanches continue to severely impact many of the world's roads, regardless of the anticipated changes to the climate. The weather impacts are not going to go away, even if the degree to which they affect roads varies from year to year. So what is the change all about? What is most rapidly changing today is the way in which we operate and maintain our roads. Drivers' expectations, traffic volumes, resource levels, information technology and knowledge of our climate continue to evolve and continue to influence the actions we take to effectively, efficiently and sustainably move people and goods.

At the Winter Road Congress in 2006, we learned about many technical, mechanical and institutional advancements in winter maintenance. In 2010 we had the opportunity to learn about all that has been achieved since then. To begin with, we could see how expanding a focus from winter maintenance to winter service reaps efficiencies through integration and information sharing. Likewise, we discovered the challenges and opportunities that were introduced when we extended the time horizon to consider how today's activities will impact the next generation. This sustainable perspective – considering long-term social, economic and environmental consequences – ensures that our efforts to meet our needs today will not impede others from meeting their needs in the future.

Summaries of select papers presented at the 2010 Congress represent a slice of the many exciting and intriguing topics to be covered. For example, we learned about efforts in Finland to incorporate customer needs into the planning process, as well as French efforts to explore ways to increase competition between contractors and to decrease contract costs. We explored the social, environmental and economic aspects of winter services, including the importance of winter maintenance for cyclists, and the use of advanced communications to address visibility hazards during heavy snowfall. Expanding on technology, specifically with respect to winter service information systems, we learned about efforts in the U.S. to improve road weather information products using vehicle probe data, as well efforts in Japan to use real-time positioning information of snow removal machinery to improve operations.

With respect to more traditional winter maintenance challenges, the Congress included an examination of the distribution of spreading agents on the road surface and an assessment of skid resistance of porous asphalt pavement under winter conditions. While at the same time, there was exciting papers about sustainability, such as more thorough studies of the impact of de-icing salts on the environment. And the link between climate change and winter service is explored in multiple studies that examine regional climate models on the road network and how to incorporate the anticipated changes into winter services.

Road users' demands for consistent, high quality level of service, matched with reductions in resources and a need to reduce our environmental footprint means that we must change. Sharing our successes ensures that we evolve in a coordinated manner. And sharing our experiences, both bad and good, helps each of us make the best decisions possible about what to implement next. The 2010 Winter Road Congress proved to be an invaluable opportunity for all to advance the state-of-the-practice and to raise awareness about these successful solutions.

In spite of the numerous demands on attendees' time; technical tours, visits, equipment displays etc. available to Congress attendees, the technical sessions were very well attended. It can be concluded that there is no single combination of winter road maintenance approaches suitable universally for all countries. There are simply too many climatic, societal, economic, and other environmental considerations. However, sharing knowledge and learning from each other certainly can lead to significant savings in time and precious resources.

Based on the experiences, the International Winter Road Congresses continue to be premier world forums for the international exchange of information. A final sincere wish; that to facilitate technology transfer, road administrations and their service providers employ, wherever possible, open systems design principles. In closing, we hope that the Congress continues to bring us all a little closer to achieving the Congress' main them 'keeping road users on the move in winter'.

1.6.2 International snowplough championships

In the framework of the XIIIth International PIARC Winter Road Congress, the first international snowplough championships took place in Quebec in 2010. The organization of this event was managed by the Ministry for Transport of Quebec, with the assistance of the Technical Committee B5.
The objective of this friendly competition was to evaluate the ability of the truck drivers from around the world to clear snow through a course set up for this occasion.

More generally the idea was:

- To develop a feeling of membership and recognition of the drivers of snowploughs relative with their trade.
- To allow the snowplough operators-plough to exchange and discover the working methods and the procedures in the other countries.
- To sensitize the Congress attendees and the exhibitors with the work of the truck drivers to clear snow.
- To develop skills for precise, fast and sedentary control.

Twenty snowplough drivers come from seven countries, including Americans, Swedes, Andorrans, French, Moroccans, Koreans and Canadians.

Given the success of this competition it was decided to organize a test within the framework of the XIVth Congress in Andorra.

1.6.3 Report from a Seminar in Hrádec Kralové, Czech Republic

Seminar Theme:
International Seminar on Technical Solution for Sustainable Winter Service

The international seminar was held in Hrádec Kralové, Czech Republic on October 7 - 9, 2009. The seminar was planned as a regional event in cooperation with PIARC TC B5 – Winter Service, Ministry of Transport of the Czech Republic, Road and Motorway Directorate of the Czech Republic. The neighbouring countries were especially invited as lecturer and listener.

Seminar Topics:

- Experiences from winter maintenance
- Technology, materials and mechanization in winter maintenance
- Research and new technical solutions in winter maintenance

Seminar objective:
The Seminar was intended as a European event, focused on winter service in European countries, mainly neighbouring countries to the Czech Republic.

Increasing demand and struggling constraints for the winter service: traffic growth/no economical disruption/limited environmental impact/provide safe road conditions/minimum operation costs

Exchange knowledge on technical issues and improve our practices

A global approach is needed: A Sustainable Winter Service

1.6.4 Report from a Seminar in Ulan Bator, Mongolia

Seminar Theme: Management of Winter Service in an Extreme Continental Climate Country

The international seminar will be held in Ulan Bator, Mongolia on April 6 - 8, 2011. The seminar is planned as a regional event in cooperation with PIARC TC B5 – Winter Service, Ministry of Road, Transportation, Construction and Urban Development of Mongolia and Department of Roads, Mongolian Government Implementing Agency. The neighbouring countries were especially invited as lecturer and listener.

Seminar Topics:

- Level of service for winter maintenance,
- Weather forecast and information to road users
- Solutions for Snow drift
- Winter maintenance on gravel roads (snow removal, sand)
- Grain size (salt, sand) Heated sand;
- Heavy traffic management when snowy;
- Equipment vehicles (chains, studs)...

Seminar objective:
The Seminar was intended as an event, focused on winter service in extreme continental climate, mainly neighbouring countries to Mongolia

2 RECOMMENDATIONS FOR FUTURE R&D AREAS

Many areas deserve attention in the future. Both in the areas listed above under the title news and in areas where development has continued for many years already but also in quite new areas. Stimulating topics for the TC are listed below:

Defining and harmonization levels of service under budget constraints (include also the aspect of acceptability by the public) / Crisis management of snow storm events.

Sustainability and climate change consideration in winter operation (taking into consideration increased variability in weather conditions including uncertainty regarding the occurrence and magnitude of harsh winter conditions)

Advanced technology for data collection and information to users and operators, with particular focus on vehicle-based technology

Preparation of the 2014 Winter Road Congress in Andorra

BIBLIOGRAPICAL REFERENCES

PIARC International Seminars;

- Technical Solution for Sustainable Winter Service (Hrádec Kralové, Czech Republic, 7-9 October 2009)
- Management of Winter Service in an Extreme Continental Climate Country (Ulaanbaatar, Mongolia, 6-8 April 2011)

Papers in Routes/Roads;

- No. 342: “Information flow system for winter service”
- No. 345: “Introduction to the XIIIth International Winter Road Congress”
- No. 345: “Assessing new winter maintenance management approaches at the Ministère des Transports Québec”
- No. 345: “Interaction in road maintenance planning – from customer needs to road winter maintenance in Finland”
- No. 345: “Discussion on the practical application of DSRC in measures to counter visibility hazards in cold areas with heavy snowfall”
- No. 345: “The importance of winter maintenance for cyclists”
- No. 345: “Development of a system for the flexible shifting of snow removal sections from using real-time positioning information on snow removal machinery”
- No. 345: “Improving road weather products with vehicle probe data”
- No. 345: “Skid resistance of porous asphalt pavement under winter conditions”
- No. 345: “Distribution of de-icing salts on the road surface”
- No. 345: “Research on environmental impact of spread de-icing salts”
- No. 345: “The environmental sub-model of the Swedish winter model – updated algorithms for the description of salt damage to roadside environment”
- No. 345: “Analysis of regional climate model simulations of transport-related climate indices over southern Québec”

- No. 345: “What impact will climate change have on roads in Sweden and how to deal with it”
- No. 345: “Removal of snow in Vienna in 1910”
- No. 346: “Québec 2010 – XIIIth International Winter Road Congress: First time ever in America!”
- No. 346: “General report of the XIIIth International Winter Road Congress – Québec City, February 8-11, 2010”

Technical Committee Reports;

- “A Study of Winter Service Management Systems (WSMS) and Road User Information” (to be published in 2011)
- “Sustainable Development and Winter Road Service” (to be published in 2011)
- “Impact of Climate Change on Winter Service” (to be published in 2011)
- “Communication with Road Users” (to be published in 2011)

Others;

- “Snow and Ice Data Book (3rd edition),” published in February 2010

STRATEGIC THEME C

SAFETY OF THE ROAD SYSTEM

FOREWORD

By Jeffrey Paniati, USA, Strategic Theme C Coordinator

Road safety has been part of the World Road Association's agenda since 1953, when it created its first technical committee to explore this issue. Since then, the Association's focus on this topic has only continued and intensified. What started with one committee has grown and evolved to become the basis of one of the Association's core Strategic Themes, with a number of experts dedicated to studying various aspects of safety and important reference products emerging as a result.

In the last cycle, we saw the completion of Road Safety Audit Guidelines, Human Factors Guidelines, Road Safety Inspection Guidelines, and the publication of the Road Safety Manual –a flagship product bringing together information designed to assist a broad range of users within the road community. In the present cycle, we have continued this work with the completion of new and updated products – among them a revised Catalogue of Design Safety Programs and Countermeasures and a new web-based Road Tunnel Manual – to be showcased at the World Road Congress. This is part of the Association's commitment to ensure its resources remain responsive to the current needs of users.

The goal of Strategic Theme C: Safety on the Road System is to improve the safety and efficiency of the road system, including the movement of people and goods on the network, while effectively managing the risks associated with road transport operations and the natural environment. Four technical committees encompass the Strategic Theme on Safety: Safer Road Infrastructure (C.1); Safer Road Operations (C.2); Managing Operational Risk in Road Operations (C.3); and Road Tunnel Operations (C.4)

TC C1 held three well-attended seminars on a variety of topics related to safer road infrastructure, one of them in conjunction with TC C2 on the subject of vulnerable road users. They upgraded four guidelines to the Road Safety Manual and completed auditing and analysis of 12 national standards for road design. The Technical Committee published an article for Routes/Roads magazine on Vulnerable Road Users and Safety Situation in Africa (No.347). The TC C1 Technical Session at the Congress will include presentations on relevant topics covered during the cycle including linear settlements, road safety impact assessment, and human factors in road design and operations.

TC C2's broad scope presented particular challenges but allowed it to take on less traditional road infrastructure topics. The Technical Committee held five seminars in three continents, two of these in coordination with other PIARC Technical Committees, creating synergies based on common interests. TC C2 completed papers on diverse topics including national road safety policies and strategies, media campaigns for road safety, and a publication on the State of the Practice for Cost Effectiveness Analysis (CEA), Cost-Benefit Analysis (CBA), and Resource Allocation.

The work produced by both TC C1 and TC C2 will serve as the basis for a thorough update to the PIARC Road Safety Manual, which will be completed within the next cycle.

TC C3 focused on integrated risk management with expanded research into decision-making processes, reduction of risk, and risk management tools. TC C3 held two successful international seminars and one workshop. Written works produced in the four-year cycle included two articles for Routes/Roads (No. 344 and No. 346) and nearly 50 papers and case studies.

During the 2008-2011 cycle, TC C4 assembled a wide array of documents and reports on best practices in the area of tunnel operations and management and improving safety of tunnels' users. Publications for this cycle included five technical reports from the preceding cycle and nine new technical reports. TC C4 published an article in Routes/Roads (No. 342) and one is currently in progress for publication in an upcoming edition. TC C4 devoted time and effort to drafting, evaluating and approving the "Road Tunnel Manual", a new on-line compendium of all PIARC guidance on road tunnel operations readily accessible on PIARC's website. The Manual includes a new specific dictionary on road tunnels containing definitions for more than 150 terms with translations in 20 languages. TC C4 organized two well-attended seminars and three workshops with participants from nearly 30 countries.

All four committees will highlight their products and outputs and share lessons learned at their technical sessions as part of the XXIVth World Congress in Mexico City. These sessions present a valuable opportunity to exchange information on the most relevant findings of the work performed by the committees and their working groups.

I would like to thank the members of Strategic Theme C technical committees for their hard work over the past cycle. The seminars, reports, case studies, publications and other products delivered during this cycle will advance the goal of road safety as we look to continuing work in the new cycle and the increasing attention that this issue is receiving as a result of the UN Decade of Action. I am confident that the work of the Strategic Theme will be important resources for transportation practitioners seeking to enhance the safety of roads and tunnels around the world.

TECHNICAL COMMITTEE C.1
SAFER ROAD INFRASTRUCTURE

2008 – 2011 ACTIVITY REPORT

CONTENTS

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1. GENERAL

This report provides an overview of PIARC activities of Technical Committee C.1 on Safer Road Infrastructure for 2008-2011.

2. THE WORK PROGRAMME AND ORGANIZATION

2.1. Human Factors in Road Design that Influence Road User Behaviour

Issue: C.1.1 – Human Factors in Road Design that Influence Road User Behaviour		
Description of the selected strategies	Assess international design standards about key human factors. Review safe road design in urban areas using segregated or shared road space for the needs of vulnerable road users and public transport.	
Working group leader	Sibylle Birth – group leader Deborah De Grasse – deputy group leader	
Cooperation within PIARC	Cooperation with Technical Committees C.1.2 (Safe design for urban roads and C.1.3 (Vulnerable road users)	
Cooperation with other organisations		
Outputs		**Date**
Technical reports	• Review of the Human Factors Guideline in English, French and Spain • National and continental reports about the audits of national design standards in respect of Human Factors • International report about key human factors and design principles • Advice for revision and upgrading of checklists of the Road Safety Audit and Inspection Guidelines and Catalogue of Design Safety Problems and Countermeasures. • Upgrading of the Human Factors sheets and the System Approach Chapter in the PIARC Road Safety Manual	April 2011
Articles	Spatial perception, the secret of safe roads	2011
PIARC international seminars	Cape Town, South Africa Delhi, India	October 2009 March 2011
Aspects are relevant to developing countries and countries in transition		

The UN-Global Plan for the Decade of Action for Road Safety defines the framework for the Decade of Actions in Chapter 4 as follows:

“The guiding principles underlying the Plan for the Decade of Action are those included in the "safe system" approach. This approach aims to develop a road transport system that is better able to accommodate human error and take into consideration the vulnerability of the human body. It starts from the acceptance of human error and thus the realization that traffic crashes cannot be completely avoided. The goal of a safe system is to ensure that accidents do not result in serious human injury. The approach considers that human limitations - what the human body can stand in terms of kinetic energy – is an important basis upon which to design the road transport system, and that other aspects of the road system, such as the development of the road environment and the vehicle, must be harmonised on the basis of these limitations. Road users, vehicles and the road network/environment are addressed in an integrated manner, through a wide range of interventions, with greater attention to speed management and vehicle and road design than in traditional approaches to road safety”.

2.1.1. The Traditional Approach

Accident investigation plays an important role in the development of road designs. Traditionally, it begins with the consequences being assessed at each accident location, which is generally considered to be the final point where the car comes to a halt or where the collision or the damage occurs.

In this case, black-spot analysis commences with a review of police data to identify correlations between accident features and “suspicious” road features (e.g. grip, geometry, wheel rut) or “suspicious” driver features (e.g. performance deficits, drunkenness, abilities, age, sex). On the one hand, this method is convenient, but on the other it is fraught with difficulties. There has been a lack of specified inspection features and no validated procedures that take into consideration the background of driving errors. Sometimes it is obvious that the road should be reconstructed. But very often the analysis ends without reaching any conclusions as to what can be done. As a result, the recommendations try to minimise the consequences of the accident, for example through the installation of crash barriers, additional warning signs, speed limits or, very often, traffic signals.

Traditional passive safety measures lead to the achievement of “failure-forgiving roads”. They often encompass advance warning of hazards for the driver in the form of road features (for instance, rumble stripes). But roads must also be designed in such a way that the road user is neither confused nor invited to take risks. Road designs also need underpinned with the concept of making the road “self-explanatory”. The goal of the notion of “self-explanatory road design” is to ensure that interpretation of road features is consistent with the action that they are required to take.

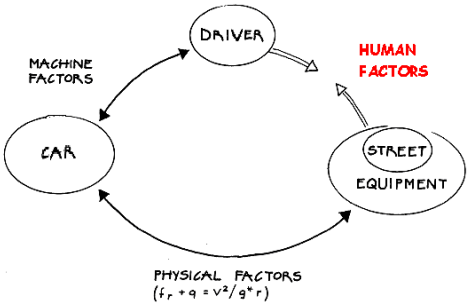
2.1.2. The Human Factors Approach

By contrast, the Human Factors concept takes into consideration the triggers of the driver's reactions and patterns of behaviour, which may result in an accident.

In applying the Human Factors concept to traffic accidents, the road safety expert seeks to establish the reasons that led to a driver’s operational error, which finally resulted in an accident.

After decades of trial and error seeking to adapt road users to the technical elements of the transport system (vehicles and roads), it has now been established that the opposite is more effective: adapt the technical subsystems to road users' abilities and limitations.

It is well known that human factors have an enormous influence on the safe handling of technical systems. Human factors can be described as people's contributions to damaging events. It is the generic term for those psychological and physiological patterns which are verified as contributing to operational errors in machine and vehicle handling.



In the case of road safety, the human factors concept considers road features that influence driver behaviour.

Many of the often-observed operational errors result from the direct interaction between road characteristics and the driver's reaction characteristics. Because the driver's reaction characteristics cannot be changed, attention should be focused on a self-explanatory road design. The PIARC Guideline "Human Factors Guiding Principles: Spatial perception of driving environment for Safer Road Infrastructure" explains the relationship between several road features that trigger incorrect driving reactions, most of which happen unconsciously. Detailed examples and sketches allow the engineer to understand the relationship between bad road features and operational errors. They can be used as a kind of checklist in "on-the-spot" investigation of accident points or in road safety inspections (RSI). They can also be used to qualify planning and design processes in road safety audits (RSA).

Such as the physical factors of geometry, dynamics, braking distances etc three main classes of human factors have been detected:

The human factors concept aims to reduce the probability of operational errors and ultimately of driving errors by promoting user-friendly and self-explanatory road design. This means that the road has to be designed for clarity, and that potentially dangerous points have to be designed so as to be understood, perceptible and recognisable. The road user should be neither confused nor invited to take risks. The goal of the notion of "self-explanatory road design" is to increase the unmistakable interpretation of road features. Such a user-friendly, self-explanatory road design should directly result in a reduction in accident frequency and severity.

The first edition of the Human factors guideline was published in 2008. During the session 2008 – 2011 it was upgraded and translated by a working group comprising of engineers and psychologists to provide further guidance on engineering design considerations such as:

- Transition zones
- Optical density of the field of view
- Lateral fixation objects
- Town and village entrances
- Multiple critical points
- Deficiencies in Traffic control devices

The working group developed a checklist of questions about how well human factors are already integrated into road design standards. Design standards from Canada, Japan, Portugal, Germany, Czech Republic, Netherlands, Hungary, China, India, South Korea, Malaysia, France, Burkina Faso, Australia and Mexico were audited.

The group did an enormous work on creating a guideline for taking Human Factors into the structure of National Road Design Standards.

2.2. Safe Design for Roads in Urban Areas

Issue: C.1.2 – Safe Design for Roads in Urban Areas		
Description of the selected strategies	Assess design guidance on safe design in urban areas (including vulnerable road users). Review safe road design in urban areas using segregated or shared road space for the needs of vulnerable road users and public transport.	
Working group leader	Philip Vaneerdewegh – group leader Jürgen GERLACH – deputy group leader	
Cooperation within PIARC	Cooperation with Technical Committees C.1.1 (Human factors) and C.1.3 (Vulnerable road users)	
Cooperation with other organisations	COST 358 Pedestrians Quality Needs (Jürgen Gerlach)	
Outputs		**Date**
Technical reports	• Revision and upgrading of checklists for interurban and urban main roads in the present RSA and RSI in respect of urban areas • Review of the Technical Sheets in the PIARC RS Manual as far as they contain recommendations on urban roads with the result what should be taken away, improved and added with general remarks • Upgrades to the PIARC Catalogue of Design Safety Problems and Countermeasures within the present structure for urban conditions	2011
Articles	Recent approaches to design for urban roads that promote improved road safety.	2011
Other events	Joint COST 358 and OECD Ped safety Committee Walk 21 in den Haag Pedestrian safety conference University Brno COST 358-meeting	November 2010 October 2009
Aspects are relevant to developing countries and countries in transition		

While guidelines, processes and recommendations for designing motorways, highways and interurban roads are generally very well structured, organised and known all over the world, less guidance is available about design of urban roads. Given the increasing evidence of accident patterns on urban road networks, it is evident that urban road risk analysis could be improved. Most deficiencies in urban road environments relate to vulnerable road users (VRU).

Sight distance (indivisibility) between vehicles and vulnerable road users is a very important consideration, especially with respect to parking layout designs to ensure adequate visibility between vehicles and pedestrians/bicyclists at intersections and pedestrian crossings. Visibility restrictions reduce the opportunity for drivers to perceive and react to conflict situations in sufficient time. While this issue is evident in all countries, the presence of sight obstructions on footpaths is more prevalent in developing countries. In Egypt, for example, issues such as mixed purpose roads traversing small villages and towns, dangerous urban road sections with uncoordinated or inconsistent alignment which result in high speed traffic in urban areas results in severe problems for vulnerable road users

2.3. Design improvements for vulnerable road users (outside of cities)

Issue: C.1.3 – 2.3. Design improvements for vulnerable road users (outside of cities)		
Description of the selected strategies	Assess design guidance on safe design for vulnerable users in rural areas. Select design examples of good practice for the needs of vulnerable road users along those interurban roads to improve the situation in so called linear settlements.	
Working group leader	Boubacar H Diallo – group leader Hans-Joachim Vollpracht – deputy group leader	
Cooperation within PIARC	Cooperation with the Technical Committees C.1.1 and C.1.2, C.2, (intended but not yet confirmed with A.4 and B.3)	
Cooperation with other organisations	WHO UN – Road Safety Collaboration, Global Plan for the Decade of Action For Road Safety	
Outputs		**Date**
Technical reports (published in Routes Roads articles)	• Undertake survey, collect best practices guidelines and investigate case studies from different countries in regard with safety for non motorised road users • Revision and upgrading of checklists for RSA and RSI in respect of vulnerable road users • Revision and upgrading of the Technical Sheets in the PIARC RS Manual • Upgrade on this issue the World Road Association Catalogue of Design Safety Problems and Countermeasures.	2010/2011
Articles	No. 347: “They call them Coffin Roads” No. 347: “Road that serve the neediest users, yet all to often kill them in the process”	August 2010
Aspects are relevant to developing countries and countries in transition but there are experiences from European Countries as well.		

Design improvements for vulnerable road users are essential for urban roads and included in the tasks of the issue of roads in urban areas. For this reason the work plan was reduced to design examples of good practice for the needs of vulnerable road users along interurban roads to improve the situation in so called linear settlements.

The most critical situation in respect of road safety is the mixture of functions where there is no clear distinction between the interurban and urban area. Here we find linear settlements often with commercial activities or roadside trading spreading along the interurban roads in an uncontrolled manner. Examination of crash data reveals a high proportion of pedestrian fatalities in these circumstances, which are the result of a lack of planning policy.

Linear settlements respectively the urbanization of highways and express roads mostly result from of the lack of access control and poor road network investment strategies and development planning. The result is an undesirable mix of residential and business uses spreading along heavily trafficked high speed arterial roads.

Development of this type impacts both safety and the efficiency of the road network function. Travel speeds are reduced and travel time increases, impacting on the movement of people and goods. In addition to the impacts on safety and efficiency, it also affects the health of people living along these roads, due to noise and pollution. The provision of infrastructure, such as water supply and sewerage, is less efficient.

The work plan was concentrated on the right strategies for avoiding such developments of linear settlements and the countermeasures for existing situations.

2.3.1. Reasons for Deficiencies from the Perspective of Vulnerable Road Users

Pedestrians, cyclists, and other vulnerable road users are over-represented in accident statistics in developing and emerging country statistics, even though motorisation in these countries is considerably lower. Children, the disabled and elderly are especially vulnerable: children cannot be expected to follow all rules and act sensibly and attentively all the time and haven't development the judgement and skills to interact with traffic, while disabled and elderly people often cannot react as quickly and are not as mobile.

A common deficiency in developing countries and countries in transition is the lack of access control along motorways and highways that traverse urban areas. Roads with different functions are not properly separated, resulting in roads performing both connection and access functions.

In other cases, existing roads through villages and towns are simply widened, often at the expense the pedestrian sidewalks and wide hard shoulders.

So road transport requires different design policies for urban and interurban roads (refer to PIARC catalogue on design safety deficiencies and countermeasures).

2.3.2. The Counter Strategies

Land use planning should be considered as an integral task in most of the PIARC topics – financing roads, road safety, performance management and sustainable mobility.

Road network infrastructure that functions well is crucial for a country's economy. Road network improvement should be a key priority of development aid projects. Connectivity between major centres is essential for trade and exchange and should be separated from local road networks to ensure quality of life. The latter seems to be neglected in most aid projects in developing countries.

Separation of vulnerable road users from roads used by high speed traffic has to be of a principle underpinning national transport policy and an issue of cooperation for Ministries of Transport, Economy, Housing, Agriculture, Interior, Environment and Finance.

It is necessary to control the land use along interurban roads and to rigorously control direct property access from the main carriageway. While many countries have legislative provisions to manage access control, the effectiveness of the controls can be diminished by bribery and corruption. In many cases, the road administration has no power at all to control access. An international review of legislative provisions to manage access control and its enforcement should be an issue for consideration in the next session.

Access control is only the last part in the chain that commences with master land use planning for urban development and building development control. Road network planning supported by Road Safety Impact Assessments (RSIA) needs to be integrated with land use planning.

This new approach to infrastructure safety management must be further developed in the next PIARC session from 2012 to 2015.

2.4. Improvements in Safe Working on Roads

Issue: C.1.4 – Improvements in Safe working on Roads		
Description of the selected strategies	Assess the approaches to improving safety for those working on roads. and for those using the road	
Working group leader	Mike Greenhalgh – group leader Beth Alicandri – deputy group leader	
Cooperation within PIARC	Close co-operation with TC 2	
Outputs		**Date**
Technical Reports and Manuals	• Update the PIARC Road Safety Manual in respect of road works • Guideline on Work zone safety	2011
Article	Keeping workers and travellers safe during road construction and maintenance	2011
Aspects are relevant to developing and developed countries,		

Commentaire [b1] : I don't think this is any different from the guideline in the third bullet.

Many road safety engineers and planners are familiar with the 4 (sometimes 5) E's for safety 'Engineering', 'Evaluation', 'Education' and Enforcement' and, sometimes, 'Emergency services'.

For the safe, efficient and effective management of temporary traffic management (TTM), it is proposed that a 4 C's principle be adopted i.e. TTM should be designed, operated and maintained such that the works are: Clear, Concise, Comprehensive, and Credible.

Guidelines developed by this working group encompass:

1. Introduction (including the results of the International Survey)
2. Principles: This chapter addresses "what we should think about" in work zone design, implementation and operations. It is general in nature.

3. Definitions: This chapter covers language conventions used in the guide
4. Roles and Responsibilities: This chapter takes a broad view, as the roles and responsibilities of parties differ in every country. However, this provides a structure for understanding how the important players can work together.
5. Planning and Design: This technical chapter includes information on achieving a balance between safety and mobility throughout the work zone planning and design process
6. Implementation and Operations: This technical chapter includes detailed information on signs and traffic management techniques for setting up and operating work zones.
7. Personnel: This chapter provides an overview of appropriate training and equipment for workers. Given the wide range of occupational health rules and regulations, it is very general in nature.
8. Typical Layouts: This technical chapter provides specific examples of methods of designing and operating a variety of work zones types on a variety of road types.
9. Checklists: This chapter provides straightforward information to use in determining if the safety issues for your work zone have been appropriately considered.

The focus is on safety of both workers and road users in construction zones. And in so doing have prepared a guideline document that emphasizes low-cost solutions that can be implemented in developed and developing countries

The number of work zones is increasing – in developed countries to replace aging infrastructure and in developing and transitional countries as their network matures. With an increase in traffic volumes, the demands to improve the networks and provide additional capacity increases. Further, the positive effects of countermeasures to improve the safety of road works is proven – Austria instituted a work zone safety program on motorways in 2004 that has led to a reduction of more than 60% in the number of injury crashes.1 Now the risk of an injury accident in a work zone is the same as on the rest of the network. The UK reports2 similar findings for minor works on trunk roads and motorways: “there was not a statistically significant increase in accidents due to the works”.

For road workers, the safety issues of the work zone are obvious – their workplace is surrounded by many rapidly moving vehicles. For the driver travelling in a work zone, the hazards, although less noticeable, are still important. In the frequently changing environment that occurs during road work, the driver is often surprised and may not have the necessary information or space to make safe and sound decisions or manoeuvres.

The basic strategy of a Safe System approach in work zone is to ensure that in the event of a crash, the impact energies remain below the threshold likely to produce either death or serious injury. This threshold will vary from crash scenario to crash scenario, depending upon the level of protection offered to the road users involved. For example, the chances of survival for an unprotected pedestrian hit by a vehicle diminish rapidly at speeds greater than 30km/h, whereas for a properly restrained motor vehicle occupant the critical impact speed is 50km/h (for side impact crashes) and 70 km/h (for head-on crashes).

Given the need to build, improve and maintain roads while they are open to traffic, the vulnerabilities of the road worker must be considered. The risks to workers from the travelling public, as well as the risks to the travelling public because of the work zone, can be minimized. However, protecting the driving public, as well as these vulnerable road workers, requires cooperation and collaboration from many sectors. At a minimum:

- Politicians must take an active interest in road safety;
- Highway and road authorities must develop and implement safety standards for road works;

- Designers must consider safety issues as they develop roadway plans;
- Contractors must assure their personnel are appropriately trained and equipped;
- Road workers must actively follow safety procedures;
- Drivers must behave responsibly;
- Police must actively participate in speed management and work zone safety.

2.4.1. Results of an International Survey on Improvements in Safe Working on Roads

In July 2008, the World Road Association (WRA) team addressing work zone safety under Technical Committee 1.4 *Safer Road Infrastructure* prepared and distributed a survey to all committee members. The survey covered the following topics:

- Guidelines and Standards
- Legal Aspects
- Surveillance of the Work Zone
- Training and Accreditation of Workers
- Communication
- Urgent Interventions
- Crash Statistics in Work Zones

The majority of respondents identify driver related issues (inattention, speeding) as current work zone problems. Almost half the respondents mentioned an issue related to standards, either they were insufficient, or not being followed properly. Less frequently mentioned problems included: the overall crash problem and short duration work zones.

2.5. Work on the PIARC Road Safety Manual

The PIARC Road Safety Manual has had its criticism with regards to its practicality of usage as well as its contents. Since the manual has been introduced in 2003, the manual also needs updating as many new work and approaches to road safety has been introduced globally.

The PIARC administration sees the urgent need to upgrade and update the manual in order for it to be more relevant and friendlier to all sectors concerned with road safety.

Technical Committees C.1 and C.2 have been mandated to outline the plans for PIARC to achieve the following objectives:

- Produce a new manual that is easier to use and relevant to all users
- Convert the manual from a heavy hardcopy version to a more friendly web based structure
- Upgrade and update the manual from the past and present work of both technical committees including relevant global work on road safety.

This proposal outlines the plans as collectively discussed by both committees in the common meeting held in Cape Town, South Africa.

As a result of a review, it was agreed that the content of the PIARC Road Safety Manual is largely still up to date and relevant. However, a general consensus was made that the recent structure is difficult to read and to handle primarily because the manual is a heavy document and that the different potential users of the manual may have different needs and interests.

The new PIARC Road Safety Manual will move from the book form to a web based knowledge structure for varying levels of decision makers and road safety practitioners

who will find their tools and facts easily guided by the introductory chapter. It will provide the user with the main messages about road safety and the important role of road infrastructure guided by a framework with a short description of the overall architecture for the different levels and tools.

At the common meeting of TC C.1 and C.2 in Cape Town, South Africa, the architecture was defined as a pyramid with three levels:

- The top of the pyramid will be for the policy makers: policy planning, legal framework, organizational structure, financial decisions, settlement/land use policies and other planning issues.
- The middle of the pyramid will be more for middle management: the road infrastructure safety management which includes data management, road safety action plans, network assessments, design policies, implementation and evaluation.
- The bottom of the pyramid will be the most practical part of the manual and is intended to practitioners on the ground: local level for the data collection and the performance of post and pro-active infrastructure safety strategies.
- With the pyramid concept, these levels will have different rooms – sectors and subsectors- which may be restored, updated or refurnished independently from time to time according to the development of best practice. The chapters of the existing manual with their annexes and the outputs of the earlier TC 3.1 and the present TC 2.1 and 2.2 will fill these rooms in an integrated manner.
- Ultimately, the web-based manual will have a few pages for each level, introducing the main concepts and approaches with appropriate links to the specific subsections, reports, guidelines, technical sheets and tools for calculations. These links can be organized by touching the special sectors in the pictogram of the pyramid which will be part of the introductory chapter about the general contributions of the road infrastructure to road safety.

3. THE OUTPUTS

As mentioned in the work plan tables of the four working groups the following reports, articles and other outputs are provided:

- Revised Human Factors Guideline for Safe Road Infrastructure
- Human Factors in Road Design – A Comparison of current international design elements as they relate to human factors of spatial perception
- Revision of the Checklists for Road Safety Audits and Inspections in respect of Urban roads
- Work zone safety guidance

Articles in Routes and Roads about

Human Factors in Road Design and Operation:
- No : Spatial Perception - the secret of safe roads

The linear settlement problems for road safety:
- No. 347: “They call them Coffin Roads”
- No. 347: “Road that serve the neediest users, yet all to often kill them in the process”

Safe Road works:
- No. : “Keeping workers and travellers safe during road construction and maintenance”

3.1. Seminars

The TC organized three international seminars in conjunction with the hosting countries:

- Safer Road Infrastructure and Operations, Kuala Lumpur, Malaysia 20–24 October 2008 together with TC C.2. The members of TC C.1 gave the following presentations:

  "The role of road infrastructure in the Road Transport Safety System" H.-J. Vollpracht
  "The proactive approaches of Road Safety Audit and Inspection" Lise Fournier
  "The Catalogue of design safety problems and countermeasures" Mike Greenhalgh
  "The Human Factors Guideline" Sibylle Birth
  "Road Safety in Germany" Jürgen Gerlach

- Promoting Road Safety for Vulnerable Road Users, Cape Town, South Africa 25-27 October 2009 together with TC C.2. The members of TC C.1 gave the following presentations:

  "How to make our Towns safer?" Hans-Joachim Vollpracht
  "Safety Deficits in Urban Roads" Jürgen Gerlach
  "Safety of Vulnerable Road Users in India" Aditya Bahadur and Anil Sharma
  "VRU and Engineering issues" Lise Fournier
  "Space perception and Road Design for Vulnerable Road Users" Sibylle Birth
  "Bicycle Safety and Road design" Paul Schepers
  "Improving Road Safety for VRU on Belgian Highways" Phillip Vaneerdewegh
  "Work Zone Safety" Mike Greenhalgh

- International Seminar on Road Safety, New Delhi, India 14-19 March 2011. The members of TC C.1 gave the following presentations:

  "PIARC helps performing Twinning projects for enhancing Road Safety" H.J. Vollpracht
  "The new approach of Road Infrastructure Safety Management" Jürgen Gerlach
  "Spatial perception of the driving environment and road Safety" Sibylle Birth
  "Human Factors guiding principles" Daniel Aubin
  "Safe Work zones for Indian Roads" Aditya Bahadur
  A Student Work shop on safer Indian roads with several members of the TC

3.2. Participation in other events

Two regular meetings had been combined with national events on road safety:

- The TC meeting in Valencia May 31st – June 2nd 2010 was combined with the Spanish/US Seminar on the Highway Safety Manual. TC members did chair session and made contributions

- The TC meeting in Birmingham October 31st to November 4th 2011 was combined with the WRA Congress of the UK. TC members chaired a session and made contributions

The Chair was a member of the UN – Road Safety Collaboration Meeting working on the Global Plan for the Decade of Actions for Road Safety

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3. Twinning Project EG08/AA/TP13: The Twinning Expertise for Enhancing Road Safety in Egypt, Cairo 2011
4. Forschungsgesellschaft für Straßen- und Verkehrswesen: Guideline and standards for the design of urban roads, orig: Richtlinien für die Anlage von Stadtstraßen, Köln, 2006

TECHNICAL COMMITTEE C2
SAFER ROADS OPERATIONS

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

The following names have been involved in activities associated with TC C.2. The names are sorted by the best performance in terms of meeting attendance.

Name	Surname	Country	TOTAL MEETING ATTENDED
George	MAVROYENI	AUSTRALIA	7
P.M.W.	ELSENAAR	NETHERLANDS	6
Arve	KIRKEVOLD	NORWAY	6
Alberto	MENDOZA	MEXICO	6
Yoshitaka	MOTODA	JAPAN	6
Randall	CABLE	SOUTH AFRICA	5
M. Jesus	LEAL BERMEJO	SPAIN	5
Michael	GRIFFITH	USA	4
Paul	GUTOSKIE	CANADA	4
Ahmad Farhan	SADULLAH	MALAYSIA	4
Paul	DE LEUR	CANADA	3
Mario	LEIDERMAN	ARGENTINA	3
Mr. Josef	MIKULIK	CZECH REPUBLIC	3
Lucy	WICKHAM	UK	3
Etienne	WILLAME	BELGIUM	3
Alain	BROES	BELGIUM	2
Asa	ERSSON	SWEDEN	2
Peter	HOLLO	HUNGARY	2
M. Tibor	MOCSARI	HUNGARY	2
Mr. Thomas Thume	NIELSEN	DENMARK	2
Sixten	NOLEN	SWEDEN	2
Lise	TOURIGNY	CANADA-QUEBEC	2
Eric	VIOLETTE	FRANCE	2
Juan Pedro	AGUILAR SAENZ	SPAIN	1
M. Leif	BEILINSON	FINLAND	1
M. Mohamed	BENJELLOUN	MOROCO	1
Günter	BREYER	AUSTRIA	1
Andrei	CRISTIAN	ROMANIA	1
Dramane	DIALLO	MALI	1
Véronique	FEYPELL	FRANCE	1
Soobeom	LEE	REPUBLIC OF KOREA	1
José	LISBOA SANTOS	PORTUGAL	1
Nicole	MUHLRAD	FRANCE	1
Adama	N'GUIRO	MALI	1
Marc	SHOTTEN	USA	1
Ted	TREPANIER	USA	1
Athanasios	TSANTSANOGLOU	GREECE	1
Wim	WIJNEN	NETHERLANDS	1
Theodora	ZISOPOULOU	GREECE	1

1. INTRODUCTION

1.1. General

This activity report will report the activities carried out by members of the Technical Committee C.2, on Safer Road Operations. This technical committee is under the Strategic Theme C: Safety of the Road System, and is part of the following committees:

- C.1: Safer Road Infrastructure
- C.2: Safer Road Operations
- C.3: Managing Operational Risk in Road Operations
- C.4: Road Tunnel Operation

Due to the complementary relationship between C.1 and C.2, the two committees have held several meetings and seminars together, until 2009, when the PIARC secretariat decided that it would be more beneficial to split our activities, as we may cover more developing countries, especially for the seminar programmes.

1.2. Mandate

The mandate given to TC C2 was to ultimately help to ensure that the operation of the road system is made safer. Therefore, the terms of reference given to TC C2 was primarily on the software side of the road safety equation.

1.3. Terms of Reference

The followings are the agreed terms of reference at the starting point of this session.

<u>Issues and Strategies</u>

- C.2.1 – Comparison of national road safety policies and plans
  - Review national road safety policies and plans across a range of countries.

- C.2.2 – Best practices in safety campaigns by public administrations
  - Identify different approaches to road safety campaigns undertaken by public administrations.
  - Review the different media that are used for promoting road safety.

- C.2.3 – Cost effectiveness of safety measures and allocation of resources
  - Study and compare the cost benefit analysis used by different road authorities for investment in safety schemes.

- C.2.4 – Institutional regulation aspects
  - Consider the different approaches taken by road administrations based upon legislation and regulations in relation to the safe operation of roads.

1.4. Organisation

In the first meeting in Paris (March 26 and 27th 2008), the terms of reference was given, and amongst the thirty three attendees, it was agreed that four working groups were to be established. At full strength, TC C.2 has 71 members from 42 countries (members: 47, Corresponding members: 16 and Associate Members: 8)

The initial distribution amongst working groups was as follows:

WG	Issues	Leader	Group members	Members having more than 1 group	Effective Group member
C2.1	Comparison of national road safety policies and plans	George Mavreyoni, Australia	9	6	15
C2.2	Best practices in safety campaigns by public administrations	Randall Cable, South Africa	8	4	12
C2.3	Cost effectiveness of safety measures and allocation of resources	Michael Halladay, USA & Wim Wijnen, Netherlands	6	5	11
C2.4	Institutional regulation aspects	No leader appointed	2	3	5

At the second meeting in Kuala Lumpur (October 21 to 23rd 2008), there was a change in the presidency of TC.C2, with Prof. Dr. Ahmad Farhan Sadullah replacing Prof. Dr. Radin Umar Radin Sohadi. In this meeting, Ms. Lucy Wickham from the United Kingdom was appointed as the leader for C.2.4. In Kuala Lumpur, each working group (except C.2.4) has had substantial initial work done since Paris. Much credit acknowledged to the group leaders and a few committed group members. TC C2 was also told that Michael Halladay was to go into retirement, and Michael Griffith from the United States of America would be replacing him as the member as well as the group leader for TC C.2.3.

After Kuala Lumpur, TC.C.2 found some period of stability and was able to focus better on the given mandate. However, this technical committee had an inherent issue which has hampered progress throughout the session. The incompatibility between the predominantly engineering background-members with the more social dimension issues in the terms of reference was quite troubling. In particular, the scope of working groups 2 and 4 for safety campaigns and institutional regulation respectively were very much in a non-familiar territory to many of the team as well as the working group members. Despite this, both working groups attempted to honour their respective terms of reference.

2. MEETINGS

In total, seven meetings were scheduled and six were official meetings with one meeting became an unofficial meeting. The unofficial meeting was in Queretaro, Mexico on 27th to 29th April 2009. The reason for this was due to the initial outbreak of the H1N1 disease in Mexico, and there was an advice not to visit Mexico. Consequently, it was decided that that scheduled third meeting was to be called off. However, as the decision was made whilst several members had already started their journey, five participants made it to Queretaro and had an unofficial meeting run.

During this session (2008 – 2011), seven meetings were held as follows:

	Venue	Date	Participants
1	Paris, France	March 26 -27, 2008	33
2	Kuala Lumpur, Malaysia	October 21-23, 2008	18
3	Queretaro, Mexico	April 27-29, 2009	5
4	Cape Town, South Africa	October 28-29, 2009	17
5	Oslo, Norway	June 3-4, 2010, Oslo	17
6	San Jose, Costa Rica	Nov 8-12, 2010	10
7	Buenos Aries, Argentina	May 11-12, 2011	10

Acknowledgement is given to all the hosts to the meeting.

Working Groups C2.1 and C2.3 were able to progress with minimal problems and were able to meet their deliverables. Working Group C2.2 had a lot of problems but was able to progress and had finally able to provide their deliverable. However, Working Groups C2.4 was unable to perform as expected. It was then decided by the Strategic Theme Coordinator to drop the terms of reference as provided for C2.4. Whilst TC C.2 members acknowledged the importance of the institutional regulation aspects of road safety, we had to appreciate the difficulty for predominantly engineers to address the complex legal and institutional issues as required for C2.4.

The followings were the final deliverables:

Technical Committee Reports;

- Comparison of National Road Safety Policies and Plans
- Best practices in road safety campaigns by public administrations
- Cost Effectiveness of Safety Measures and Allocation of Resources

Others;

- State of the Practice “Cost-Effectiveness Analysis (CEA), Cost-Benefit Analysis (CBA), and Resource Allocation” Report

3. SEMINARS

Whenever possible, TC C2 will organize seminars to coincide with its meetings. The purpose of the seminars is to share and provide capacity building to participants from the host countries. The followings were the seminars organized, with the Kuala Lumpur and Cape Town being co-organized with TC C1.

- Safer Road Infrastructure And Operations: How To Make Our Roads Safe (Kuala Lumpur, 22 October 2008)
- International Experiences on Most Effective Road Safety Measures (Queretaro, Mexico, 28 April 2009)
- Promoting Road Safety for Vulnerable Road Users (Cape Town, South Africa 25-27 October 2009)
- Seminar on Safer Road Operations (Costa Rica, 8-12 November 2010)
- The Influence of Road Infrastructure on Road Safety Operation (Buenos Aires, Argentina, 9 – 11th May 2011)

4. CONTRIBUTION TO THE PIARC ROAD SAFETY MANUAL

PIARC has mandated both TC C1 and C2 to update and upgrade the PIARC Road Safety Manual as part of the deliverables for this session. Several discussions were made together and a proposal was given to the Strategic Theme coordinator in Washington DC in June 2010. It was agreed that an upgrade to the manual is to be carried out as there are many valuable elements in the existing manual. It was also agreed that the task to the present members are to come up with a proposed architecture for an upgraded manual, prepare a concrete master plan for the execution of the upgrade in the next cycle and provide inputs to the upgraded manual by streamlining the output of the present cycle work to fit the architecture of the upgraded manual. These suggestions have been adopted by PIARC to be implemented in the next session.

5. STRATEGIC PLAN FOR PIARC

TC C2 has participated in the request by PIARC to propose the strategic plan for the 2012 – 2015 session. Several issues were highlighted in the meeting with the Strategic Theme Coordinator in June 2010, which included the issues of

- The Terms of Reference – rigidity and appropriateness
- Lacking common and clear outcomes
- All issues in the TOR are not integrated towards certain clear outcomes – missing a framework
- Inappropriateness of background to members
- Commitment issues

6. WORLD ROAD CONGRESS PREPARATION

Members of TC C.2 were also active participant to all matters regarding the preparation for the Mexico City World Road Congress in September 2011. These included the suggestion for titles, evaluation of abstracts, evaluation of papers, suggestion for special sessions and the preparation for the technical committee session.

7. REPRESENTING PIARC

In the current session, there have been several platforms for road safety to be discussed at the global level. As part of the 13TH REAAA CONFERENCE, in Korea from Sept 23rd – 26th 2009, PIARC had established an understanding with the Road Engineering Association of Asia and Australasia (REAAA). A session for road safety was organized, and the President for the TC C.2 was invited to represent on behalf of PIARC. The title of the paper presentation was “PIARC’s Role in Road Safety”

The first Global Ministerial Conference on road safety was held in Moscow in November 2009. This was the precursor to the United Nations Declaration on the Decade of Action for Road Safety between the years 2011 to 2020. The President of TC C.2 was invited to accompany the President and the Secretary General of PIARC to attend this auspicious event.

TECHNICAL COMMITTEE C.3
MANAGING OPERATIONAL RISKS
IN ROAD OPERATIONS

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

[Committee members]

Michio OKAHARA	Chairman, Japan
Hiroyuki NAKAJIMA	English speaking secretary, Japan
Johanne LEGAULT	French speaking secretary, Canada-Quebec
Gustavo MORENO	Spanish speaking secretary, Mexico
Johan HANSEN	WG#1 Leader, Sweden
Connie YEW	WG #2 Leader, USA
Roberto ARDITI,	WG #3 Leader, Italy
Yukio ADACHI	Japan
Radu ANDREI	Romania
Martin ANTUSAK	Czech Republic
Ioannis BENEKOS	Greece
Enrique BELDA	Spain
Maarten BLOMME	Belgium
Jachen CAJOS	Switzerland
Maurice CAMMACK	Australia
Michael CLOUTIER	Canada
Eric DIMNET	France
Yves ENNESSER	France
Federico FERNANDEZ	Spain
Roly FROST	New Zealand
Ryszard GORELL	United Kingdom
Annie GROLEAU	Canada-Quebec
Csilla KAMARAS	Hungary
Alain LEFEBVRE	Belgium
Ashaari MOHAMAD	Malaysia
Rahimi MOHSEN	Iran
Tony PARKER	United Kingdom
Lenka PETROVA	Czech Republic
Akira SASAKI	Japan
Tarek SAYED	Canada
Christian STEFAN	Austria
Keiichi TAMURA	Japan
Kai TATTARI	Finland
Udo TEGETHOF	Germany
Panagis TONIOLOS	Greece
Graham VOWLES	United Kingdom
Stefen ZIRNGIBL	Germany

[Non-committee contributors]

Ruyue BAI	China
Dajin GUO	China
Aimin LI	China
Gaoqiang ZHANG	China
Hiroyuki SHIMAMOTO	Japan
Francisco ALAREZ	Mexico
Karina LARA	Mexico
Lucia NUNEZ	Mexico
Morgan WEBERT	Mexico

1. OVERVIEW OF THE TECHNICAL COMMITTEE C.3, MANAGING OPERATIONAL RISK IN ROAD OPERATIONS, FOR 2008 TO 2011

1.1. General

Many parts of the world are at significant risk of natural and man-made disasters. Modern industrial practices, dependencies on critical infrastructures make countries further vulnerable to not only a wide range of natural disasters but also serious man-made disasters. These factors, combined with increased population densities and property development in hazard zones, have heightened countries' disaster risks as follows:

1. Natural disasters include typhoons, cyclones, hurricanes, flooding, tornadoes, drought, wildfires, earthquakes, volcanoes, landslides, ice storms, and dust storms that all contribute to disease epidemics.

2. Man-made disasters include critical infrastructure threats, oil and chemical spills, building fires, mechanical equipment explosions, and terrorism.

TC C.3 lays special emphasis on integrated risk management with expanded research into risk assessment, decision-making processes, reduction of risk and risk management tools. More specifically TC C.3 has the three terms of reference:

1) Introduce Risk Management Techniques in the Road Sector
2) Risks Associated with Natural Disasters, Climate Change, Man-made Disasters and Security Threats
3) Social Acceptance of Risks and Their Perception

1.2. Activities

Since the beginning, TC C.3 has been making considerable efforts to achieve its objectives.

1) Eight TC C.3 meetings including 2 meetings to be held in Japan and Mexico City
2) Formulation of three working groups and production of working group reports
   A) Introduce Risk Management Techniques in the Road Sector
   B) Risks Associated with Natural Disasters, Climate Change, Man-made Disasters and Security Threats
   C) Social Acceptance of Risks and Their Perception
3) International survey
4) Two international seminars in Iasi, Romania and Beijing, China
5) Two international workshops in Rome, Italy and Osaka, Japan
6) Publications
7) Collected case studies

Photo 1. Technical committee members (TC C.3)

2. WORK PROGRAMMES AND ORGANIZATIONS

2.1. Work programmes

The work programmes of TCC.3 were organized as follows:

Table 1 Meetings and Seminars

No.	Date	Place	Summaries
1	26 and 27 March 2007 	Paris, FRANCE	● 22 attendance ● Opening and introduction of technical committee ● Presentations on the productions of the previous cycle ● Discussion and presentations on all the issues assigned to the technical committee ● International seminar ● Designation of the terminology committee and web coordinator ● Next meeting
2	5-7 November 2008 	Madrid, SPAIN	● 28 attendance ● Terms of reference of C.3.1, C.3.2 and C.3.3, created working group programs by leaders ● Presentations of case studies ● Planning of international questionnaire ● International Seminars ● Technical visit to new opened tunnel
3	13-15 May, 2009 	Vancouver, CANADA	● 30 attendance ● TOR of C.3.1, C.3.2 and C.3.3, updated Working group programs, work in progress and reports ● Presentations of case studies ● International questionnaire ● Final announcement International Seminar in Romania and next Int'l Seminar in China ● Technical visit to Sea to Sky Highway

4	4-8 November 2009 	Iasi, Romania	● 32 attendance ● First international seminar ● Terms of reference of C.3.1, C.3.2 and C.3.3, updated Working group programs, work in progress and reports by leaders ● Presentations of case studies ● International questionnaire ● Next Int'l Seminar in China (2010) ● International workshop in Rome ● Special session at Mexico congress 2011
5	5-7 May 2010 	Rome, ITALY	● 35 attendance ● Final report of TC-C3 ● The next strategic theme ● International survey ● 2nd International Seminar in China ● Schedule of next meeting in China ● Presentations of case studies ● Congress in Mexico
6	9-13 November 2010 	Beijing, CHINA	● 30 attendance ● Second international seminar ● Final report of TC-C3 ● The next strategic theme ● Congress in Mexico ● Presentations of case studies ● Second international workshop
7	25-28 April 2011 	Osaka, JAPAN	● Final report of TC-C3 ● The next strategic theme ● Congress in Mexico ● Presentations of case studies
8	26-30 September 2011	Mexico city, MEXICO	● PIARC world congress

2.2. Work organizations

TC C.3 lays special emphasis on integrated risk management with expanded research into risk assessment, decision-making processes, reduction of risk and risk management tools. More specifically TC C.3 has the three terms of reference and formulates three working groups to work on each three terms of reference:

1) Technical committee steering members

Chairman:	Michio OKAHARA (Japan)
English speaking secretary:	Hiroyuki NAKAJIMA (Japan)
French speaking secretary:	Johanne LEGAULT (Canada-Quebec)
Spanish speaking secretary:	Gustavo MORENO (Mexico)
WG #1 leader:	Johan HANSEN (Sweden)
WG #2 leader:	Connie YEW (USA)
WG #3 leader:	Roberto ARDITI (Italy)

2) Working group #1 “Introduce Risk Management Techniques in the Road Sector”

Issue C.3.1 INTRODUCE RISK MANAGEMENT TECHNIQUES IN THE ROAD SECTOR	
STRATEGIES	**OUTPUT**
Analyze the use of risk management techniques by road authorities and identify best practice. Identify case studies that exemplify the benefits of using risk management in different aspects of the road sector.	A guide to assist road authorities in the use of risk management. Case studies that demonstrate the value of using risk management.

Working group members

Leader: Johan HANSEN (Sweden)

Member: Yukio ADACHI (Japan)
Radu ANDREI (Romania)
Maarten BLOMME (Belgium)
Jachen CAJOS (Switzerland)
Maurice CAMMACK (Australia)
Ryszard GORELL (United Kingdom)
Csilla KAMARAS (Hungary)
Alain LEFEBVRE (Belgium)
Johanne LEGAULT (Canada-Quebec)
Rahimi MOHSEN (Iran)
Lenka PETROVA (Czech Republic)
Tarek SAYED (Canada)
Christian STEFAN (Austria)

Photo 2. Working group #1 members

2) Working group #2 “Risks Associated with Natural Disasters, Climate Change, Man-made Disasters and Security Threats”

Issue C.3.2 RISKS ASSOCIATED WITH NATURAL DISASTERS, CLIMATE CHANGE and MAN-MADE DISASTERS	
STRATEGIES	**OUTPUT**
Identify approaches being used to assess the risks associated with natural disasters, climate changes and man-made disasters. Identify strategies that are being applied to reduce or mitigate the risks associated with these circumstances.	Share methodologies that have been used to evaluate the risks associated with natural disasters, climate changes and man-made disasters. Case studies documenting strategies that have been effective in avoiding or mitigating these risks.

Working group members

Leader: Connie YEW (USA)
Member: Eric DIMNET (France)
Yves ENNESSER (France)
Johanne LEGAULT (Canada-Quebec)
Gustavo MORENO (Mexico)
Michio OKAHARA (Japan)
Keiichi TAMURA (Japan)
Kai TATTARI (Finland)
Udo TEGETHOF (Germany)

Photo 3. Working group #2 members

3) Social Acceptance of Risks and Their Perception

Issue C.3.3 SOCIAL ACCEPTANCE OF RISKS AND THEIR PERCEPTION	
STRATEGIES	**OUTPUT**
Identify and evaluate studies of the public’s perception to risks in the road system and the factors that effect those social reactions. Study methods that are used to measure people’s acceptance of risks.	Report on factors affecting social reaction to risks in road related activities. Produce guidelines that road authorities can use when addressing corrective actions affected by public’s perception of risks.

Working group members

Leader: Roberto ARDITI (Italy)
Member: Ioannis BENEKOS (Greece)
Enrique BELDA (Spain)
Annie GROLEAU (Canada-Quebec)
Ashaari MOHAMAD (Malaysia)
Hiroyuki NAKAJIMA (Japan)
Panagis TONIOLOS (Greece)

Photo 4. Working group #3 members

3. SUMMARY OF THE FINAL REPORT

3.1. Introduce Risk Management Techniques in the Road Sector

This guidance "A Guide to Risk Management in a road organization" will be prepared by WG1 of the PIARC Technical Committee TC C.3, Introduce Risk Management Techniques in the Road Sector, which will address the following aspects:

- General principles of risk management
- Organizational risk management
- Risk management for road network
- Risk management for road projects
- Crisis management
- Library of examples of methods and case studies

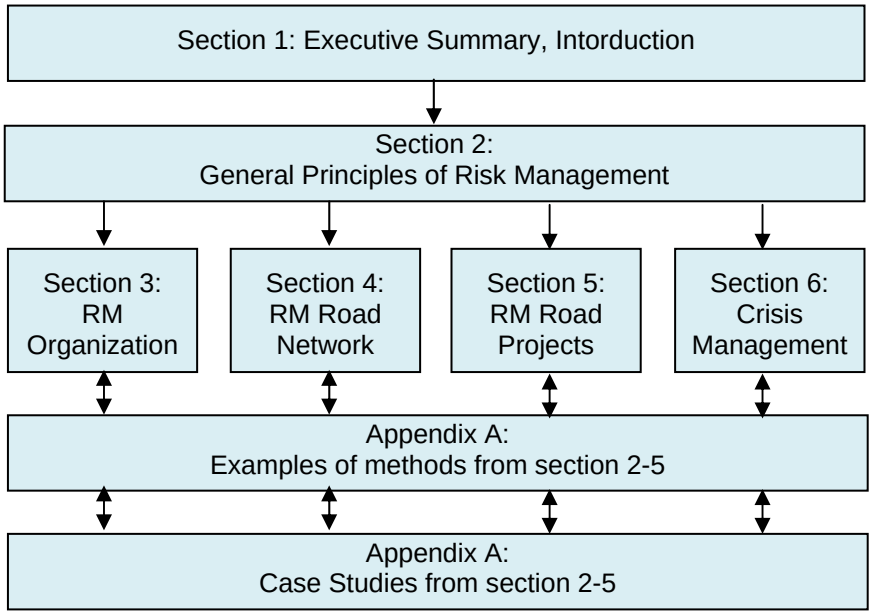

Figure 1. Report structure of introduce risk management techniques in the road sector

3.2. Risks Associated with Natural Disasters, Climate Change, Man-made Disasters and Security Threats

This section is prepared by WG2 of the PIARC Technical Committee TC C.3, Managing Risk Associated with Natural Disasters, Climate Change and Man-made Disasters, and Security Threats, which will address the following aspects:

- Methodologies to evaluate risks associated with all hazards;
- Managing risks associated with natural disasters
- Managing climate change risks and the adaptation of transportation infrastructure; and
- Risk Management Toolbox

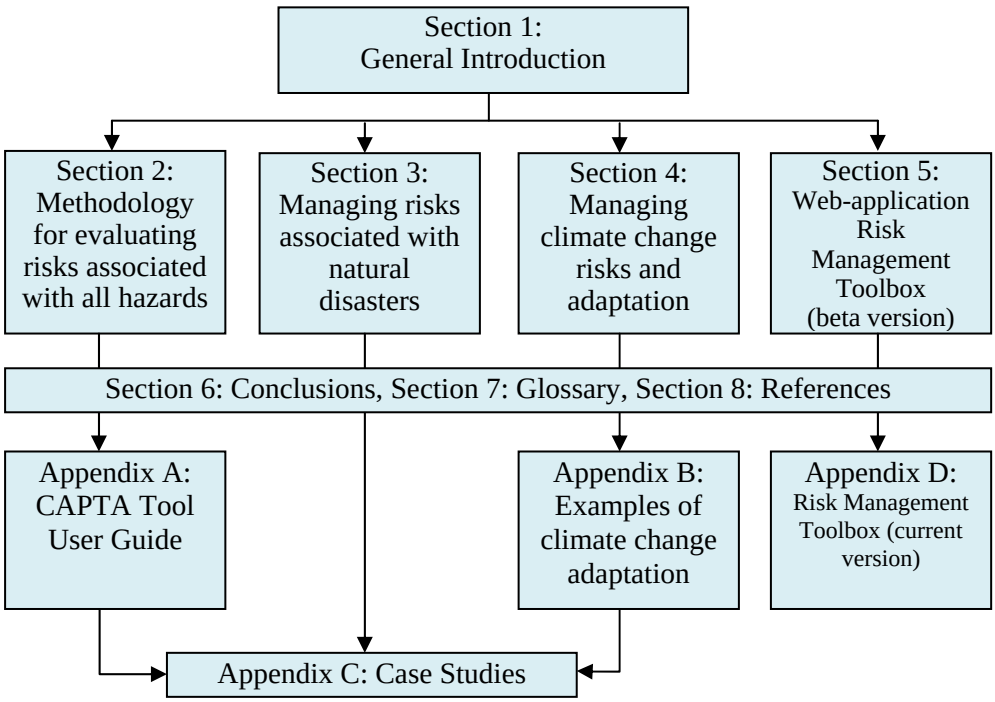

Figure 2. Report structure of risks associated with natural disasters, climate change, man-made disasters and security threats

3.3. Social Acceptance of Risks and Their Perception

PIARC's strategic plan 2008-2011 assigned to International Technical Committee C.3 the task to:

- Identify and evaluate studies of the public's perception to risks in the road system;
- Identify and assess the factors that affect those social reactions.

This technical report is the first answer to such a demand. International Technical Committee C3 launched a devoted working group (C3.3). The authors drafted this technical report in the form of an outlook of existing literature in the field of risk perception, looking for application examples of available research in the field of road operation.

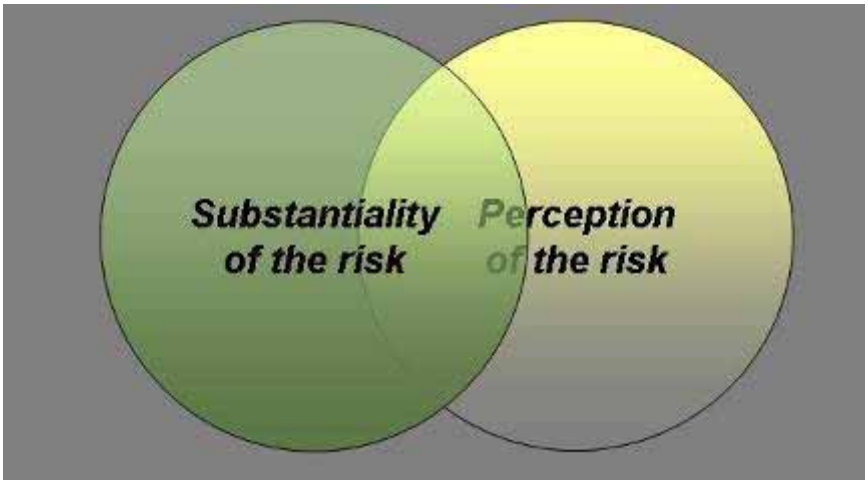

Figure 3. Difference between perception and the statistical relevance of a risk

4. INTERNATIONAL SURVEY

TC C.3 carried on an international survey to understand the current status of risk management implementation in practices in member countries. The survey consisted of questionnaires related to three main themes; 1) Risk management for network, 2) Risk management for projects, 3) Risk associated with natural disaster, climate change and man-made disasters, and 4) Social acceptance of risks and their perception. The survey collected the answers from 20 countries.

The results of the survey show the followings;

1) The application of risk management for network can be categorized into three major fields, natural disaster management for network, critical component analysis for network, and safety management for network.
2) The risk management technologies have been implemented into various kinds of road project management.
3) Only few countries have started to consider the effect and adaptation to the road system from the climate change, although many countries implemented risk management techniques against natural disasters.
4) Some countries have studied social acceptance of risks mainly in road safety area. However, there are no studies on the policy decision based on risk perception.

5. INTERNATIONAL SEMINARS AND WORKSHOPS

5.1. 1st International Seminar

The 1st international seminar jointly organized by TC C.3 and the Government of Romania was held at the City Hall of Iasi, Iasi, Romania during November 5-7, 2009. About 140 participants attended this seminar; 100 from Romania and 40 from overseas including Australia, Canada, China, France, Italy, Japan, Malaysia, Mexico, U.K. and U.S.A. In the Opening Session we welcomed a keynote speaker from the World Bank, who discussed the importance of risk management for road agencies. Then, 22 papers were presented regarding risk management for roads in the following four Technical Sessions:

Session 1: Introduction of Risk Management Techniques
Session 2: Good Practices of Risk Management Techniques for Highway Systems and Projects
Session 3: Management of Risks Associated with Natural and Man-made disasters and Climate Change
Session 4: Social acceptance of Risks and Their Perception

In addition to the international presentations, various studies on risk management, road safety and construction technologies were reported by the Romanian attendees. They were very helpful to understand the current situation of Romania with relation to risk management for roads.

The Seminar provided an ample opportunity for all the participants to share the knowledge and new ideas on risk management for roads. The proceedings of the seminar are available from the PIARC web site (http://www.piarc.org/en/).

Photo 5. 1st international seminar in Iasi

Photo 6. Iasi city hall

5.2. 2nd International Seminar

The 2nd international seminar was conducted at the Grand Skylight CATIC Hotel in Beijing, China on November 11-13, 2010. This seminar was co-organized by TC C.3 and the Ministry of Transport, People's Republic of China. The seminar focused on the risk and emergency management for roads, and was approximately attended by 190 participants; 150 from China and 40 from 16 countries including Burkina Faso, France, Italy, Japan, Malaysia, Mexico, Sweden, U.S.A. and Viet Nam.

We had three keynote speakers, one from the U.S.A. and two from China, in the Opening Session. 21 technical presentations were made in the following four Technical Sessions:

- Session 1: Introduction of Risk and Emergency Management Theory and Techniques in the Road Sector
- Session 2: Good Practices of Managing Risks Associated with Natural and Man-made Disasters and Climate Change in the Road Sector
- Session 3: Good Practices in Contingency Planning and Emergency Response to Natural and Man-made Disasters and Climate Change in the Road Sector
- Session 4: Social Acceptance of Risks and Their Perceptions in Road Related Activities

In the seminar a special emphasis was laid on presentations on emergency measures after disaster occurrence in addition to risk management techniques which are in principle applied to management before disaster occurrence. The Seminar provided an ideal opportunity to disseminate and share the knowledge and techniques of risk management for roads. The proceedings of the seminar are available from the PIARC web site (http://www.piarc.org/en/).

Photo 7. 2nd international seminar in Beijing

Photo 8. Audience of the seminar

5.3. 1st International Workshop

The 1st international workshop jointly organized by TC C.3 and the Italian PIARC was held at the parliament hall of ministry of infrastructure, Rome, Italy at November 6, 2010. About 50 participants attended this workshop. Then, 11 speakers presented and shared the information on regarding risk management for roads between Italian local participants and international technical committee members.
All presentations, pictures and other material were uploaded into web sites of Italian PIARC and SINA:
(http://www.aipcr.it/BrowseFolderDocuments.aspx?FolderId=27)
(http://www.grupposina.it/main.asp?pag=News&visual=ok&ID=39&fam=head&lingua=ita&soc=sina)

Photo 9. 1st international workshop in Rome

5.4. 2nd International Workshop

The 2nd international workshop jointly organized by TC C.3 and the Japan road association was held at the Osaka international conference hall, Osaka, Japan at April 26, 2011.

Photo 10. 2nd international workshop in Osaka

6. PUBLICATIONS

6.1. Route and Roads

[Number] Routes/Roads No.344
[Title] Managing the operational risk of roads - Social acceptance of risks and their perception
[Authors] Arditi Roberto, Belda Esplugues Enrique, Cecchini Bianca Maria and Fernandez Alonso Federico
[Summary] Risks exist in every field and situation, including the management of road infrastructures, but not all risks affect and interest people: the attention focuses selectively on specific risks, while others are completely neglected, considered as unavoidable facts of life. Sometimes the neglected risks are suddenly thrown into the limelight as a function of specific events and/or media campaigns. This paper aims to review the existing research and provide a general description of factors affecting risk perception, with a focus on road operations and risks related to roads.

Figure 4 Routes/Roads No.344

[Number] Routes/Roads No.346
[Title] How does social acceptance of risks and their perception influence Risk management on road operations?
[Authors] Ioannis Benekos and Panagis Toniolos
[Summary] Risk perception has been an active area of research during the last 30 years and many references have been identified with respect to this topic. Within PIARC 's strategic theme C (Safety of the Road System), Technical Committee C.3 (TC C.3) has been assigned with responsibility to undertake studies on managing operational risk in national and international road operations. A major component of the aforementioned topic relates to the social acceptance of risks and their perception and identifies and evaluates studies of the public's perception of risks in the road system and the factors that affect social reactions. This feature paper summarizes the major findings of a comprehensive review of the existing literature and case studies with a focus on road operations. It proposes a categorization of these case studies as they pertain to different groups of studies (social, psychological, technical) and targets different population cohorts, road elements, and cultures.

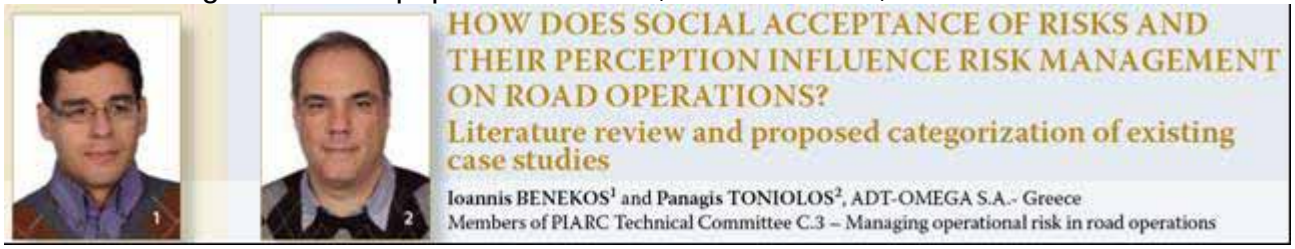

Figure 5 Routes/Roads No.346

6.2. Other publications

[Romania] Title: International Seminar on Managing Operational Risk in Roads
Authors: R. Andrei and N. Tautu

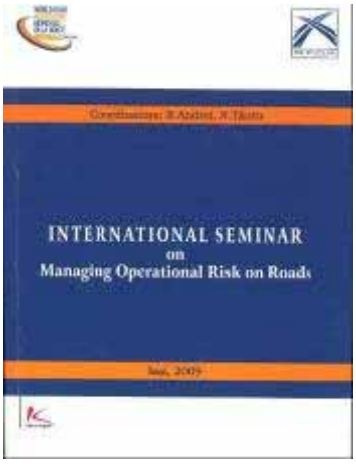

Figure 6. Romanian publication

[China] Title: Proc. of PIARC International Seminar on Risk and Emergency Management for Roads
Authors: Dept. of Transportation, Research Institute of Highway, CHINA

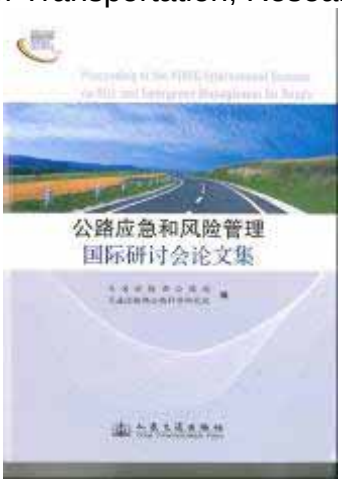

Figure 7. Chinese publication

[Italy] Title: Gestione del rischio operative nell'esercizio delle strade
Authors: Comitato technico nazionale C3
Associazione mondiale della strada comitato nazionale Italiano

Figure 8. Italian publication

7. COLLECTED CASE STUDIES

There are a lot of papers regarding risk management for roads in the meetings and seminars as shown in the following Table 2.

Table 2 Collected case studies

PIARC/TC C.3 Managing Operational Risk in Road Operations Presentation List	
Title	**Country**
2nd International Committee Meeting in Madrid (November, 2008)	
Application of Risk Analysis for Road Construction and Operation in Japan	Japan
Safety Management for Highways Projects: An Alternative Approach	UK
Explicit Safety Evaluation Example	Canada
TC C.3 Managing operational Risk in National and International Road Operation	Italy
Information Publishing System	Spain
Traffic Management Center In Madrid	Spain
Role and responsibility of DGT	Spain
3rd International Committee Meeting in Vancouver (May, 2009)	
Advances in Proactive Road Safety Planning	Canada
Climate Change Effects on Transportation infrastructure	Mexico
TC C.3 Managing operational Risk in National and International Road Operation	Italy
Public Opinion Survey for Earthquake Resistant Design of Road Bridges	Japan
Risk Management Practices in the U.S.	USA
4th International Committee Meeting in Iasi (November, 2009)	
Road system and related operational risks in Romania	Romania
5th International Committee Meeting in Rome (May, 2010)	
Risk management of airports and surrounding road network in Quebec	Quebec, Canada
Risk management practice in Flanders	Belgium
6th International Committee Meeting in Beijing (November, 2010)	
Emergency Management in China	China
1st International Seminar in Iasi (November, 2009)	
Safety Management for Highways Projects: An Alternative Approach	UK
Road Safety Risk Management in Australia-past, present and future	Australia
Actual status and implementation of the risk management on roads in Romania	Romania
PIARC methodology for identification and evaluation of the risk on the road network - Proposal for assimilation and implementation in our country	Romania
Proactive Road Risk Management Techniques - An Overview	Canada
Case Study of Road Disaster Risk Management	Japan
The system for the management of the emergency situations on public road network of Romania	Romania
Risk based estimate of transportation infrastructures	USA
Limitation of risk for traffic accidents by correlating horizontal and vertical alignments, at the design of the road routes	Romania
Earth work consolidation with drilled pilots and lowering of the groundwater level by using siphon drains on the National Road NR 15	Romania
Increasing the probability of detection and evaluation of the buried objects, archaeological sites and voids in soil by data fusion GPR-EMI	Romania
Risk management for Roads against Climate Change and Natural Disasters in Japan	Japan
Mexico Climate Change, Tabasco Case	Mexico
Risk Management for Roads in a Changing Climate: A common European Approach	France
Climate change interference and risks involved in highway management	Romania
Some considerations on the repairing and correction of the landslides on the public road network	Romania
Landslide risk management in rehabilitation works for transportation infrastructure	Romania
Geological and geotechnical characteristics of rocks from the alluvial plan of river Bahlui and their influence on safety of transport infrastructures	Romania
Interactions, impacts and influences of social acceptance of risks and their perception in managing operational risk on road operations: an overview and a proposed categorization of available case studies	Greece

Impact of Different Cultures on the Perception of Risk: The Malaysian Perspective	Malaysia
Brief Introduction of Japan's Vulnerability to Natural Disaster from the risk perception perspectives	Japan
Improving the road user information as a key factor in the management of the mobility in risk situation	Spain
2nd International Seminar in Beijing (November, 2010)	
Concept for Risk Management in a Road Management Organization	Sweden
Risk Concept for Natural Hazards on National Roads	China
Risk Management Practice in Flanders, Belgium	Belgium
Risk Identification and Control Method & Technology for Bridge and Tunnel Construction	China
Development of a National Risk Assessment Model for Road Safety	Australia
Advance of Road Safety Audit and Its Application in China	China
Managing Risks Associated with Climate Change - Mexico Case	Mexico
Road Weather Information Systems and Service in China	China
Bridge Collapse in Brasby, Finland	Finland
Technologies to Ensure Road Safety under Adverse Weather Conditions	China
Risk Management for Roads in a Changing Climate: A Common European Approach	France
Best Practices and Lessons Learned in Emergency Transportation Operations and Planning	USA
Contingency Planning for Highway Emergencies in China	China
Disaster Prevention Management and Prompt Restoration of the Tomei Expressway after the Earthquake by NEXCO-Central	Japan
Road disaster management by MLIT, Japan	Japan
Risk Management Application in Xiang'an Tunnel Construction	China
Risk Management Application in Hangzhou Bay Bridge Operation	China
Management of structures in Metropolitan Expressway	Japan
Social Perception of Risks in the Frame of Road Operation	Italy
Social Acceptance of Risks in Road Related Activities in China	China
Brief Introduction of Japan's Vulnerability to Natural Disaster from the Risk Perception Perspectives	Japan
Public Opinion Survey on Their Acceptable Level of Risks in terms of Earthquake Resistant Design of Bridges in Japan	Japan
1st International Workshop in Rome (May, 2010)	
Risk management criteria adopted by Italian Civil Protection	Italy
Operation of Roads and the impact of climate change	USA
Evolution of seismic risks: the case of L'Aquila	Italy
Management of operational risk for roads	Sweden
Risks and road safety in Italy – current frame	Italy
Risk perception and risk homeostasis: a recommendation for safer roads	Italy
Management of road related risks and human behaviour	Italy
Actions adopted by the Italian Administrative Authority for the safety of road tunnels	Italy
Operational risk of roads in China - Criteria of handling of the risk and emergency management	China
Current trends of road safety and actions undertaken by DGT for a correct perception of road operation risks	Spain
Experience in mobile laser scanning by means of LYNX system in L'Aquila City after the earthquake	Italy

TECHNICAL COMMITTEE C.4
ROAD TUNNEL OPERATIONS

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Pierre Schmitz, Belgium	(Chairman)
Didier Lacroix, France	(Past-Chairman)
Alexandre Debs, Quebec	(French speaking secretary)
Robin Hall, UK	(English speaking secretary)
Ignacio Del Rey, Spain	(Spanish speaking secretary)

Members:

Juan Marcet	(Argentina)
Arnold Dix	(Australia)
Rudolf Hörhan	(Austria)
Alexander Wierer	(Austria)
Henk Keymeulen	(Belgium)
John Emery	(Canada)
Raul Ramirez	(Chile)
Wei Liu	(China People Rep))
Miodrag Drakulic	(Croatia)
Pavel Pribyl	(Czech Rep)
Carsten Henriksen	(Denmark)
Marko Jarvinen	(Finland)
Pauli Velhonoja	(Finland)
Bernard Falconnat	(France)
Jean-Claude Martin	(France)
Jürgen Krieger	(Germany)
Ioannis Bakogiannis	(Greece)
Konstandinos Koutsokos	(Greece)
Shri Suresh Kumar Puri	(India)
Reza Akbari	(Iran)
Antonio Valente	(Italy)
Hideto Mashimo	(Japan)
Erik Norstrøm	(Norway)
Eduardo Guimaraes	(Portugal)
Antonio Pinto Da Cunha	(Portugal)
Sorin Suhane	(Romania)
Melvyn Thong Tuck Loong	(Singapore)
Drago Dolenc	(Slovenia)
Stojan Petelin	(Slovenia)
Nag-Young Kim	(South Korea)
Nam-Goo Kim	(South Korea)
Rafael Lopez Guarga	(Spain)
Manuel Romana-Ruiz	(Spain)
Vicente Vilanova	(Spain)
Bernt Freiholtz	(Sweden)
Alain Jeanneret	(Switzerland)
Urs Welte	(Switzerland)
Evert Worm	(The Netherlands)
Leslie Fielding	(United Kingdom)
Garry Poole	(United Kingdom)
Fathi Tarada	(United Kingdom)
Jesus Rohena	(USA)

Corresponding Members:

Jason Venz	(Australia)
Ahmed Kashef	(Canada)
Ludvik Sajtar	(Czech Rep)
Magnus Nygard	(Finland)
Pál György	(Hungary)
Sh J. G Mahale	(India)
Shahaboddin Moosavi-Eshkevari	(Iran)
Romano Borchiellini	(Italy)
Toshinori Mizutani	(Japan)
Joao Palma	(Portugal)
Ling Tim Soh	(Singapore)
Karol Grohman	(Slovakia)
Phil-Yeong Kim	(South Korea)
David Luiz Fernandez	(Spain)
John Buraczynski	(USA)

Associate Members:

Claude Bérenguier	(AITES/ITA)
Willy De Lathauwer	(AITES/ITA)
Jean-Paul Repussard	(European Commission)
Bernhard Kohl	(Austria)
Marc Tesson	(France)
Hossein Alami Milani	(Iran)
Chiam Boon Hui	(Singapore)
Peter Hedley	(UK)

1. WORK PROGRAMME AND ORGANISATION

1.1. Introduction

Since its creation in 1957, the PIARC Technical Committee on Road Tunnel Operations (formerly known as the PIARC Committee on Road Tunnels) has concentrated its activities on the fields of internal design, safety of users, equipment, operation and environment of road tunnels. It has voluntarily excluded from its scope the subjects concerning construction, repair and maintenance of structures, which are dealt with by the International Tunnelling & Underground Space Association ITA-AITES, with which an excellent collaboration is maintained.

During the 2008-2011 cycle, a lot of work has been to assemble best practice in the area of tunnel operations and management for improving safety of tunnels' users. To undertake this work, the Committee set up five working groups, each commissioned to investigate and report on specific aspects of the work under consideration. The working groups included C.4 members as well as a number of experts who were not members of the Committee.C.4 steered, reviewed, discussed and approved the documents produced by the working groups. More details of these working groups are provided below.

C.4 met regularly as follows:

- 26-27 March 2008 Paris, France
- 1-2 September 2008 Montréal, Canada-Quebec
- 25-27 March 2009 Madrid, Spain
- 30 Sept. - 1 October 2009 Auckland, New Zealand
- 22-24 March 2010 Buenos Aires, Argentina
- 13-15 September 2010 St Petersburg, Russia
- 23-24 March 2011 Xiamen, China
- 28 September 2011 Mexico City, Mexico

1.2. Working Group 1: Road tunnel operations

Leader:
Jean-Claude Martin, France

Secretary:
Les Fielding, United Kingdom

Active Members:
Joan Almirall, Spain
John Buraczynski, USA
Miroslav Cermak, Czech Rep.
Christophe Dalloz, France
Drago Dolenc, Slovenia
Eduardo Guimaraes, Portugal
Peter Hedley, United Kingdom
Arthur Kabuya, Belgium
Pierre Merand, France
Erik Norstrøm, Norway
Antonio Pinto Da Cuna, Portugal
Garry Poole, United Kingdom
Jonas Spartan, Sweden
Pauli Velhonoja, Finland
David Verleyen, Belgium
Urs Welt, Switzerland
Alexander Wierer, Austria

Programme:

- Recommendations for strategic road tunnel safety management
- Good practice for road tunnel emergency exercises
- Recommendations on management of maintenance and technical inspections of road tunnels
- Life cycle aspects of electrical road tunnel equipment

Meetings:

- Lyon, France September 2008
- London, UK October 2008
- Annecy, France January 2009
- Lisbon, Portugal June 2009
- Ljubljana, Slovenia November 2010
- Oslo, Norway June 2009
- New York, USA November 2010
- Lyon, France February 2011

1.3. Working Group 2: Manage and improve road tunnel safety

Leader:

Bernhard Kohl,	Austria
Jürgen Krieger,	Germany

Secretary:

Bernt Freiholtz,	Sweden

Active Members:

Ioannis Bakogiannis,	Greece
Gary Clark,	UK
Rudolf Hörhan,	Austria
Didier Lacroix,	France
Philippe Pons,	France
Ludvik Sajtar,	Czech Republic
Jiri Smolik,	Czech Republic
Frédéric Walet,	France
Christoph Zulauf,	Switzerland

Programme:

- Risk evaluation in road tunnels
- Assessing and improving safety in existing road tunnels

Meetings:

• Lyon, France	September 2008
• B. Gladbach, Germany	June 2008
• Annecy, France	November 2008
• Vienna, Austria	April 2009
• Verona, Italy	November 2009
• London, UK	May 2010
• Utrecht, NL	September 2010

1.4. Working Group 3: Influence users' behaviour in tunnels

Leader:
Marc Tesson, France

Secretary:
Andy Evans, United Kingdom
Martin Kelly, United Kingdom

Active Members
Véronique Aurand, France
Christian Basset, France
Ruggero Ceci, Sweden
Hans Kristian Madsen, Norway
Olivier Martinetto, France
Marieke Martens, Netherlands
Jean-Michel Vergnault, France
Evert Worm, Netherlands

Programme:

- Recommendations regarding road tunnel drivers' training and information

Meetings:

- Lyon, France July 2008
- Lyon, France March 2009
- Paris, France June 2009
- Stockholm, Sweden November 2009
- Dublin, Ireland February 2010
- Oslo, Norway June 2010
- Utrecht, Netherlands February 2011
- Lyon, France June 2011

1.5. Working Group 4: Air quality, fire and ventilation

Leader:

Ignacio del Rey,	Spain
Fathi Tarada,	United Kingdom

Secretary:

Arnold Dix,	Australia

Active Members:

Art Bendelius,	USA
Francesco Bezzi,	Italy
Romano Borchiellini,	Italy
Rune Brandt,	Switzerland
Bruce Dandie,	Australia
Miodrag Drakulic,	Croatia
Massimiliano Fresta,	Italy
Leslie Fielding,	UK
Norris Harvey,	USA
Hans Huijben,	Netherlands
Frédéric Herve,	France
Eddy Jacques,	Belgium
Marko Jarvinen,	Finland
Arthur Kabuya,	Belgium
Ahmed Kashef,	Canada
Antoine Mos,	France
Miroslav Novak,	Czech Rep
Norman Rhodes,	United Kingdom
Tomas Sandman,	Sweden
Christof Sistenich,	Germany
Peter Sturm,	Austria
Joao Viegas,	Portugal
Frédéric Waymel,	France
Jiri Zaparka,	Czech Rep
Franz Zumsteg,	Switzerland

Programme:

- Road tunnels: Vehicle emissions and air demand for ventilation
- Design fire characteristics for road tunnels

Meetings:

• Madrid, Spain	July 2008
• London, UK	November 2008
• New York, USA	May 2009
• Lyon, France	October 2009
• Graz, Austria	May 2010
• Ottawa, Canada	October 2010
• Brussels, Belgium	February 2011

1.6. Working Group 5: Knowledge Management

Leader, secretary and webmaster:
Pierre Schmitz, Belgium

Active members:
Roberto Arditi, Italy
Willy Delathauwer, AITES/ITA
Bernard Falconnat, France
Robin Hall, United Kingdom
Didier Lacroix, France
Rafael Lopez Guarga, Spain
Pavel Pribyl, Czech Rep.
Manuel Romana-Ruiz, Spain
Antonio Valente, Italy

Programme:

- Road Tunnels Manual in the PIARC Website (in 7 languages);
- New specific dictionary on road tunnels in the PIARC Website (in 20 languages).

Meetings:

- Madrid, Spain June 2008
- Brussels, Belgium October 2008
- Milan, Italy January 2009
- Lyon, France June 2009
- Brussels, Belgium September2009
- Prague, Czech Rep. March 2010
- London, UK July 2010
- Milan, Italy January 2011

2. PRODUCTS

2.1. Publications

Papers in Routes/Roads;

- N° 342: “Fire detection systems in road tunnels”
- N° 350: “Risk evaluation for road tunnels” ; “The ITA Committee on Operational Safety of Underground Facilities (COSUF): Five years of activity and cooperation with PIARC” ; “Security and safety of road tunnels and other critical Infrastructures” ; “Life cycle aspects of electrical road tunnel equipment”

Five technical reports, which had been mainly drafted during the preceding PIARC cycle (2004-2007), were published during the cycle 2008-2011:

- Urban road tunnels - Recommendations to managers and operating bodies for design, management, operation and maintenance
- Tools for road tunnel safety management
- Management of the operator - Emergency teams interface in road tunnels
- Road Tunnels: Operational strategies for emergency ventilation
- Direction signing on a route incorporating tunnels.

Nine new technical reports were drafted by the working groups, discussed and approved by C.4 and finally submitted for publication:

- Strategic tunnel safety management – Guidance on roles and responsibilities in 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 of systems.
- 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.
- Drivers’ education – Background to human factors and driver behaviour in tunnels, what has to be communicated to tunnel users and what the driver must do.
- 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.

The ‘Road Tunnel Manual’, a new online compendium of all of PIARC’s guidance on road tunnel operations, was drafted, discussed and approved by C.4 and finally established on the PIARC web site in 7 languages.

A new specific dictionary on road tunnels was established on the PIARC Website with 140 terms and their definitions translated in 20 languages.

2.2. Seminars

C.4 organised two seminars in developing or transition countries, which were held after a committee meeting:

- An international seminar on Tunnels and ITS Applications was held in Buenos Aires, Argentina, on 24-25 March 2010 with some 400 participants coming from 29 countries.
- An international seminar on Construction, Operations and Management of Road Tunnels was held in Xiamen, China, on 25-26 March 2011 with some 230 participants coming from 20 countries.

2.3 Workshops

C.4 organised workshops after three of its meetings:

- A symposium on ‘Tunnel safety, operations and refurbishment’ was held in Montreal (Canada) on 3 October 2008.
- A workshop on ‘Refurbishment of old tunnels’ was held in Auckland (New Zealand) on 2 October 2009.
- A number of road tunnel presentations were included in the workshop ‘World of Bridges’ held in St Petersburg (Russia) on 15 September 2010.

In addition, a special technical session on Road Tunnel Winter Maintenance and Operation, was held during the International PIARC Winter Road Congress in Québec (Canada) in February 2010.

2.4 Other products

C.4 exchanged views and cooperated with the International Tunnelling and Underground Space Association (ITA/AITES), with which it signed a Memorandum of Understanding in 2005. Specifically C.4 cooperated with their Committee on Operational Safety in Underground Facilities (ITA-COSUF).

C.4 also cooperated with the European Commission regulatory committee for safety of road tunnels.

STRATEGIC THEME D
QUALITY OF ROAD INFRASTRUCTURE

Gheorghe Lucaci (Romania), STD Coordinator

The general objective of Strategic Theme D is to improve the quality of road infrastructure through the efficient management of road assets, and in line with users' expectations and the requirements of asset managers.

Although new technology and social and environmental concerns have widened the field of activity of road administrations, infrastructure and asset management still remain the focus of their activities. The need for a more efficient use of funding requires a constant improvement of design techniques, management and maintenance of infrastructure assets. Strategic Theme D gathers experts from the whole world to address these issues.

Strategic Theme D has developed its activity into four Technical Committees and three sub-committees as follows. Each Committee's activity focuses on issues set by the Strategic Plan.

TC D1 Management of Road Infrastructure Assets
- Benchmarking of asset management methods
- Data collection for infrastructure management
- Allocation of resources across asset classes

TC D2 Road Pavements, composed of sub-Committees:

D2-a Surface characteristics
D2-b Flexible and semi-rigid pavements
D2-c Concrete pavements

Covering the following topics:
- Reducing construction time and cost
- Improved maintenance methods
- Road noise mitigation
- Monitoring of innovations
- Adaptation to climate change

TC D3 Road Bridges

- Inspections and non-destructive condition surveys
- Assessment of the condition of road bridges
- Innovative maintenance techniques
- Management of the bridge stock
- Adaptation to climate change

TC D4 Geotechnics and Unpaved Roads

- Innovations regarding treatment and use of local materials
- Innovations in construction and maintenance of unpaved roads for developing countries
- Adaptation to climate change.

Most Technical Committees have shared the work by setting up working groups. During the 2008-2011 cycle, the four STD Technical Committees and the three sub-committees have produced constant and dedicated efforts, as shown by the following reports.

Technical Committees will also be able to present their activities and achievements during their respective sessions at the World Road Congress in September in Mexico City.

Each Technical Committee held eight meetings during the 2008-2011 cycle, the eighth meeting being scheduled to take place at the Congress in Mexico City. Half way through the cycle, a two-day meeting was organized in Timisoara (Romania) in June 2010, with the participation of the Chairs and Secretaries of Technical Committees. The meeting provided the opportunity to report on the status of their activities and an improved coordination of their work in the implementation process of their work plan.

With PIARC's focus on technology and knowledge transfer, Technical Committees have done their best to organize seminars and symposiums, mostly in countries in economic transition and in developing countries. Due to the adverse economic conditions worldwide, not all STD committees were able to organize two seminars during the work cycle as planned. However, the highly technical seminars held in Cancun (Mexico), Cotonou (Benin), Nanjing (China), Buenos Aires (Argentina), Seoul (Rep. of Korea) and Namibia were successful events.

As the Coordinator of Strategic Theme D, I would like to take this opportunity to thank all Technical Committee members who have contributed to the smooth process of activities, who have given time and energy, and who have shared their knowledge to progress the products of this work cycle, whether through articles, reports or seminars.

TECHNICAL COMMITTEE D.1 MANAGEMENT OF ROAD INFRASTRUCTURE ASSETS

2008-2011 ACTIVITY REPORT

CONTENTS

1. Committee Members and Countries who contributed to the Report

Committee members and countries having contributed to the activities are as follows:

COMMITTEE MANAGEMENT

Anita KÜNKEL-HENKER	Germany
Mick LORENZ	Australia
Ghislaine BAILLEMONT	France
José ORTIZ-GARCIA	Columbia

SUPPORT

MIGUEL CASA FLOREZ	Technical Advisor of PIARC
Benjamin RUDOLPH	GERMANY

WORKING GROUP 1

Ramesh SINHAL	United Kingdom
Richard ABELL	United Kingdom
Victor BARDOCZKY	Hungary
Michael BRIDGES	United States of America
Gerhard EBERL	Austria
Gerardo FLINTSCH	United States of America
Steven GAJ	United States of America
Donald MORRISON	United Kingdom
José ORTIZ-GARCIA	Columbia
Chris PARKMAN	New Zealand / United Kingdom
Dominique A. RAFANOMEZANA	Madagascar
Jan SCHAVEMAKER	the Netherlands
Rachid TABBOUCHY	Morocco
Sophie TEKIE	Namibia
Claude TREMBLAY	France
Fernando VARELA SOTO	Spain
Alfred WENINGER-VYCUDIL	Austria
Bert DE WIT	the Netherlands

WORKING GROUP 2

Philippe LEPERT	France
Toussaint AGUY	France / Ivory Coast
Mahmoud AMERI	Iran
Ghislaine BAILLEMONT	France
Adelaide COSTA	Portugal
Angel GARCIA GARAY	Spain
Carl VAN GEEM	Belgium
Eric GHILAIN	Belgium
Pietro GIANNATTASIO	Italy
Stephane GUISSE	Belgium
Oscar GUTIÉRREZ BOLIVAR	Spain

Darko KOKOT	Slovenia
Eric MCCUAIG	Canada
Vittorio NICOLOSI	Italy
Florica PADURE	Romania
Naser REZAEI MEHR	Iran
Ricardo SOLORIO MURILLO	Mexico
Delphine TABOURICH-COUSIN	France
Adrian TOFFUL	Australia

WORKING GROUP 3

Louw KANNEMEYER	South Africa
TARO AWAMOTO	Japan
Michael BRIDGES	United States of America
Rosario CORNEJO ARRIBAS	Spain
Kostas DRIMERIS	Greece
Les HAWKER	United Kingdom
Jan INGERMAA	Estonia
Jan JANSEN	Denmark
Julian LIDIARD	United Kingdom
Thomas LINDER	Germany
Mick LORENZ	Australia
Bart MANTE	Netherlands
Jacky MUKUKA	Namibia
Osamu OTOMO	Japan
Luis DE PICADO-SANTOS	Portugal
Ward POELMANS	Belgium
Guy POIRIER	France
Shigeru SHIMENO	Japan
Garry STERRITT	United Kingdom
Even SUND	Norway
Tazaki TADAYUKI	Japan
Seppo TOIVONEN	Finland
Hamid ZARGHAMPOUR	Sweden

OTHERS MEMBERS

Valentine ACHA	Cameroon
Mahier AL-ANI	United Kingdom
Waldemar Pires ALEXANDRE	Angola
Grégoire ANDRIAMAROLAHY	Madagascar
Ernesto BARRERA GAJARDO	Chile
Subir BARAN BASU	India
Christopher BENNETT	United States of America
Safri Kamal BIN AHMAD	Malaysia
Balamu BISUTI	Uganda
Vivian BORROTO ORDONEZ	Cuba

Claude BRUXELLE	Canada
Jan CELKO	Slovakia
Richard CHALLMERS	United Kingdom
Lamine CISSE	Senegal
Maria DA CONCAIO AZEVEDO	Portugal
Salimata COULIBALY	Ivory Coast
Alain DUCLOS	France
Mehran GHOLALI HATMABADI	Iran
Desire GUIDI	Benin
Hamidou HAMA	France
Jessica HERNANDEZ	Canada
Seiichi HIROKAWA	Japan
Reza HOSSEINI	Iran
Penny KARAHALIOU	Greece
Martin KELLY	United Kingdom
Adrien KOUAKOU KONAN	Ivory Coast
Souleymane KONE	Ivory Coast
Anatole KOUZONDE	Benin
Srao KULWINDER	India
Johann LITZKA	Austria
Masao MARUYAMA	Mexico
Marie Hyacynthe MOUANGA	Senegal
Mamadou Naman KEITA	Mali
Minna Maata	Finland
Enrique DIAZ MORALES	Mexico
Dato BIN MOHD INZAN	Malaysia
Fanny MUNOZ	Columbia
Généviève NANE-NGOMA	Congo
Michael OLIVER	Canada
Blaise ONANGA	Congo
Daniel ONDIA	Congo
Jiri PROCHAZKA	Czech Republic
Rudolph RITTMANN	Namibia
Miguel Angel SALVIA	Argentina
Peter SCHUT	the Netherlands
Konsta SIRVIO	Finland
Bjorn SKOGLUND	Norway
Gabriel SOUMAHO	Benin
Tor-Sverre THOMASSEN	Norway
Carlos RUIZ TREVISAN	Chile
Masatochi UETA	Japan

2. Work Programme and Organisation

2.1 Issues and Working Groups

The goal of PIARC, Theme D is to improve the quality of road infrastructure through the effective management of assets in accordance with user expectations and managers' requests. While new technologies, social and environmental developments are expanding the sphere of interest for road authorities, infrastructure and management of assets remains their core business. The need for more efficient use of funds requires constant improvement in techniques in terms of the design, management and maintenance of assets. A better understanding of asset infrastructure and its condition is essential in order to plan maintenance and allocate limited resources across asset types, and this is reflected in the terms of reference of Technical Committee D.1.

The objectives for Technical Committee D1 for the period 2008-2011 were achieved by the work undertaken by 3 Working Groups:

- Working Group 1 – Benchmarking of asset management methods (Issue D.1.1)
- Working Group 2 – Data collection for road infrastructure management (Issue D.1.2)
- Working Group 3 – Allocation of resources across asset classes (Issue D.1.3)

2.1.1 Working Group 1 "Benchmarking of asset management methods"

The aim for Working Group 1 was to illustrate best practice asset management systems for road authorities to adopt and to benchmark costs for typical systems, relative to their investment in assets. Using case studies, the Working Group was to identify best practice and key aspects for road authorities at different stages of development to consider when choosing a system, review costs associated with implementing systems and recommend where funds are best focused.

For this issue several Countries have been asked for Case Studies. Case Studies were submitted by the Netherlands, England, Namibia, New Zealand, Scotland, Mexico, Spain, USA (Utah). Working Group 1 grouped, summarised, analysed and evaluated the data collected during the study. The results of this work will be presented in the final report "Benchmarking of Asset Management Methods" (to be published in 2011) and in the paper "Benchmarking of Asset Management Methods" (to be published in 2012) in Routes/Roads.

2.1.2 Working Group 2 "Data collection for road infrastructure management"

The aim for Working Group 2 was to produce a report which identifies options for cost effective data collection for different elements of the road infrastructure and identifies best practice for the use of that data in developing infrastructure management strategies.
The second issue deals with evaluation of network performance and high level indicators which can be used for that purpose. These High Level Management Indicators (HLMI) directly reflect the performance of the network as a whole (pavement, bridges, equipment, etc.) with respect to the expectations of various stakeholders (e.g. safety for

users, noise for neighbours, pollution for society). These indicators constitute the essential base of a rational approach for road infrastructure management.

All Case Studies were elaborated locally within the Working Group 2 itself. The data collected during the study was grouped, summarised, analysed and evaluated by the Working Group. The results of this work will be published in the final report “High Level Management Indicators” (to be published in 2011).

2.1.3 Working Group 3 “Allocation of resources across asset classes”

The aim for Working Group 3 was to review approaches used in different countries to allocate asset management resources and prioritise investment in different asset classes. Using case studies, the Working Group was to examine different resource allocation approaches and identify the benefits and dis-benefits of the prioritisation processes used, noting the differences across asset classes.

For this issue several Countries have been asked to answer to questionnaires prepared by the Working Group 3 and to submit Case Studies. The following countries responded to questionnaires: Australia, Belgium, Botswana, Denmark, England, Estonia, Finland, France, Germany, Hungary, Japan, Malawi, Namibia, The Netherlands, Norway, Portugal, Scotland, South Africa, Sweden and USA. Case studies were submitted by England, Sweden, Japan, USA, Australia, the Netherlands and South Africa.
Working Group 3 grouped, summarised, analysed and evaluated the data collected during the study. The results of this work will be presented in the final report “Allocation of Resources Across Assets” (to be published in 2011) and in the paper “Allocation of Resources Across Asset Classes” (to be published in 2012) in Routes/Roads.

2.2 Organisation of the Committee TC D.1

The membership of the TC D.1 includes 55 Members, 40 Corresponding Members, 14 Associate Members. This means a total membership of 109 persons and 46 countries.

The Committee TC D.1 was organised as follows:

Chairwoman	Anita Künkel-Henker, Germany
English Secretary	Mick Lorenz, Australia
French Secretary	Ghislaine Baillemont, France
Spanish Secretary	José Ortiz-Garcia, Columbia
Leader of Working Group 1	Ramesh Sinhal, United Kingdom
Leader of Working Group 2	Philippe Lepert, France
Leader of Working Group 3	Louw Kannemeyer; South Africa
Contact to Terminology Committee	Chris Parkman, New Zealand / United Kingdom and Richard Abell, United Kingdom
English Terminology	Chris Parkman, New Zealand / United Kingdom and Richard Abell, United Kingdom
French Terminology	Guy Poirier; France
Spanish Terminology	Ricardo Solorio Murillo, Mexico

Web-Administrator	Delphine Tabourich-Cousin, France and Ghislaine Baillemont, France
Administrator FTP-Server and Organizational Affairs	Benjamin Rudolph, Germany
Support for Seminars	Guy Poirier, France
Seminar in Namibia	Sophie Tekie, Namibia Rudolph Rittmann, Namibia and other colleagues from Namibia and the TC D.1
Technical Advisor of PIARC	Miguel Casa Florez
Translators	Martina Sánchez de la B., Germany Anja Kallmeyer, Germany and Translators for the meetings in France, Germany, Australia, United States of America, Spain, Mexico

2.3 Work Programme of the Technical Committee D.1

2.3.1 Meetings

04/2008	in	Paris, France	~31 Participants
10/2008		Munich, Germany	40 Participants
04/2009		Kalgoorlie, Australia	31 Participants
10/2009		Portland, Australia	27 Participants
04/2010		Murcia, Spain	38 Participants
10/2010		Lisbon, Portugal	37 Participants
04/2011		Swakopmund, Namibia	23 Participants
09/2011		Mexico City, Mexico	

It is worth noting that some members were not able to attend meetings of TC D.1 because of budget restrictions and problems obtaining visas for the countries were the meetings took place.

2.3.2 Seminar "Road Asset Management" in Namibia

TC D.1 sponsored and international Seminar on "Road Asset Management" in Swakopmund, Namibia, 4-6 April 2011.

The seminar attracted close to 150 members from the road sector community, members of the Association of Southern African National Road Agency, public sector officials, government officials, engineers, incorporated engineers, technicians, members of the D1 committee and consultants. Participants travelled from as far the UK, Netherlands, Spain, France, Mexico, Finland, Japan, USA, Germany, Scotland, South Africa, Malawi, Tanzania, Zambia and Ethiopia. Sixteen countries together with Namibia were represented.

Day one of the seminar focused on strategic asset management themes including road sector and transportation sector reforms. The theme was entitled “Strategic Benefits of Asset Management”. The opening ceremony was directed by the RMS Manager Mrs Sophia Belete-Tekie. It was officiated by the Minister of Works of Transport, Honourable Erkki Nghimtina.

Day two dealt with the theme, “Development of Asset Management System”, this is asset management for technocrats and policy makers in the road and transportation sector. A number of interesting papers from various countries were represented. The speakers were excellent with high track record of engineering.

Day three was a technical visit, to a salt road maintenance unit and a visit to Adeva Desalination Plant, 38 km from Swakopmund including an informative presentation on uranium mining.

The Official Gala Dinner was held at the Swakopmund Entertainment Centre for 250 people and dignitaries.

In summary, it was the first time that such an International Seminar on this topic was held in Africa. The organising committee successfully attracted outstanding speakers from the road and transport sectors. Obviously like any project there were challenges but they were overcome. Everyone gained a lot of experience. A tremendous amount of hard work went into preparing for the Seminar, but it was worth every effort. The Seminar was a true team work and the organising team did an excellent job. Thanks a lot to everyone!

More detailed information is published in the Summary Report “PIARC International Seminar: Road Asset Management, Swakopmund, Namibia, 4-6 April 2011”. The presentations of the Seminar and the Summary Report are available on the Web-Site of PIARC.

3. Publications

3.1 Technical Reports

- “Benchmarking of Asset Management Methods” (to be published in 2011)
- “High Level Management Indicators” (to be published in 2011)
- “Allocation of Resources Across Assets” (to be published in 2011)

3.2 Articles in Routes/Roads

- “Benchmarking of Asset Management Methods” (to be published in 2012)”
- “Allocation of Resources Across Asset Classes” (to be published in 2012)

4. Participation to other events

- The WG 2 findings have been used as an input for several ERAnet Road 2 projects, namely EVITA and SABARIS.
- Some members of the TC D.1 will support the next European Conference EPAM held in Sweden 2012.

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TECHNICAL COMMITTEE D.2
ROAD PAVEMENTS

2008-2011 ACTIVITY REPORT

CONTENTS

D2 COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

In accordance with the PIARC strategic plan for the cycle 2008-2011, Technical Committee D2 on Road Pavements was divided into 3 subcommittees.

- D2a – Road Surface characteristics
- D2b – Flexible and Semi Rigid Pavements
- D2c – Rigid Pavement.

The participation of members during this cycle was variable due in part to the worldwide economic downturn and the difficulty for members to obtain authorization for travel outside of their countries.

D2 COMMITTEE MEMBERS

The D2 Committee executive members included:

Michel Boulet – France, Chair
Guy Tremblay – Canada-Québec, French Secretary
Suneel Vanikar – United States, English Secretary
Francesca La Torre, Chair of D2a
David Hein – Canada, Chair of D2b
Raymond Debroux – Chair of D2c
Gheorghe Lucaci – Romania, Theme Co-ordinator

Contributing Members from Subcommittee D2a

Francesca La Torre, Chair of D2a

Peter Bryant, Australia
Luc-Amaury George, France
Rodolfo Tellez-Guitierrez, Mexico
Rajandran Padavattan, South Africa
Bernhard Steinauer, Germany
Jorge R Tosticarelli, Argentina
Peter Maurer, Austria
Margo Briessinck, Belgium
Alfred Zampou, France
Paul Harbin. Canada
John Emery, Canada
Benoit Petitclerc, Canada-Québec
Peter Jorgen Andersen, Denmark
Bjarne Schmidt, Denmark
Adolfo Guell Cancella, Spain
Mark E. Swanlund, United States
Fabienne Anfosso-Ledee, France
Jean-Etienne Urbain, France
Dimitrios Evangellidis, Greece
Christina Plati, Greece
Veronika Forrai-Hernadi, Hungary
Nirmal Jit Singh, India
Mansour Fakhir, Iran

Fillippo G. Pratico, Italy
Azmi Bin Hassan, Malaysia
Abdellah Rais, Morocco
Joralf Aurstad, Norway
Waclaw Michalski, Poland
Maria Da Conceiçao Azevedo, Portugal
Vaclav Bolina, Czech Republic
Cornel Bota, Romania
Brian Ferne, United Kingdom
Wyn Lloyd United Kingdom
Ibrahima Khalil Cisse, Senegal
Feri Bohar, Slovenia,
Bojan Leben, Slovenia
Ulf Sandberg, Sweden
Leif Sjogren, Sweden
Johan Lang, Sweden
Luzia Seiler, Sweden
Gerardo Botasso, Argentina
Manfred Haider, Austria
Julien Mane, Burkina Faso
Pierre-Louis Maillard, Canada-Québec
Kim Hyung-Bae, Korea
Eduardo E.Diaz Garcia, Cuba
Michel Gothié, France
Subhash Jindal, India
Adil Maliki, Morocco
Santiago Corro Caballero, Mexico
Gerardo Flintsch, United States
George Dimitri, France
Douglas Mladenovic, Yugoslavia

Contributing Members from Subcommittee D2b

David Hein, Chair of D2b Canada

Marie-Thérèse Goux, France
Andrus Aavik, Estonia
Maria Azevedo, Portugal
Egbert Beuving, Belgium
Rudolf Bull-Wasser, Germany
Francois Chaignon, Canada
Agnes Calberg, Belgium
José del Cerro Grau, Spain
Richard Elliott, United Kingdom
Andras Gulyas, Hungary
Keizo Kamiya, Japan
Kazuyuki Kubo, Japan
Francis Letaudin, France
Rafael Limon Limon, Mexico
Aleksander Ljubic, Slovenia
Renaldo Lorio, South Africa
Thomas Maes, Belgium

Tim Morin, Canada
Asghar Naderi, Iran
Zigmantas Perveneckas, Lithuania
Laszlo Petho, Hungary
Safwat Said, Sweden
Charles Sawadogo, Burkina Faso
Mike Southern, Belgium
Zulakmal Sufian, Malaysia
Alejandro Tagle, Argentina
Jan Van der Zwan, Netherlands
Benoit Verhaeghe, South Africa
Mats Wendel, Sweden

Corresponding Members

Guy Bergeron, Canada- Québec

Contributing Members from Subcommittee D2c

Raymond. Debroux Chair of D2c

Bryan Perrie, South Africa
H. Kotze, S. Kganyago, South Africa
Ralf Alte-Teigeler, Germany
B. Krieger, Germany
Stefan Höller, Germany
J. Steigenberger, Austria
Chris Caestecker, Belgium
Anne Beeldens, Belgium
Tim. Smith, Canada
SH. Han, South Korea
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M. Himmi, Morocco
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G. Marin, Romania
I. Gschwendt, Slovakia
A. Sajna, Slovenia
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Randolf Anger, Germany
D. Calo, Argentina
Denis Thébeau, Canada
L. Serrano Rodriguez, Cuba
Sh. Arora, India

X. Rakotonandrasana, Madagascar
J. Rasoavahiny, Madagascar
S. Corro Caballero, Mexico
M. Birnbaumova, Czech Republic
L. Vebr, Czech Republic

Associate Members

A.Jasienski, Belgium
L. Rens - Belgium

Work of Committee D2 on Road Pavements

Introduction

The main committee D2 and its three subcommittees, D2a, D2b and D2c had five topics for this cycle:

- D.2.1 – Reducing the delay and cost of construction
- D.2.2 – Improved maintenance methods
- D.2.3 – Road noise mitigation
- D.2.4 – Monitoring of innovation
- D.2.5 – Adaptation to climate change

Working groups were established for each topic consisting of members from each of the three subcommittees.

Meetings and Seminars

<u>D2a, D2b and D2c - Joint Meetings</u>

- Paris, France (April 2008): Plenary meeting, beginning of the cycle.
- Portoroz, Slovenia (October 2008): Held in conjunction with the SURF conference.
- Irvine, United States (April 2010): Plenary meeting, working group meetings, preparation for the Mexico Congress.
- Paris, France (October 2010): Plenary meeting, working group meetings, preparation of Mexico Congress.
- Mexico City, Mexico (September 2011)

<u>Joint Meetings of D2a and D2b</u>

- Rhodes, Greece, (May 2009)
- Cancun, Mexico, (August 2009): Held in conjunction with a D2a/D2b sponsored seminar on pavement maintenance)
- Paris, France (October 2010)
- Rome, Italy (April 2011)

D2c Meetings

- San Francisco, (August 2008): Informal meeting in conjunction with International Society of Concrete Pavements meeting on long life pavements.
- Cologne, Germany (December 2008): Meeting on topic improved maintenance methods.
- Vienna, Austria (March 2009): working group meetings.
- Seville, Spain (September 2009): Meeting in conjunction with the symposium organizing committee of EUPAVE on concrete pavement.
- Seoul, South Korea (October 2009): Seminar co-sponsored with the Korean National PIARC committee.
- Seville, Spain (October 2010): Informal meeting of the working groups during the Symposium on Concrete Pavement.
- Buenos Aires, Argentina (May 2011): Seminar on Concrete Pavement, working group meetings.

Work Program

As indicated, the topics were the same for each of the 3 subcommittees. The themes for each of the topics are outlined below.

D.2.1 – Reducing the Delay and Cost of Construction

Examine and document methods to reduce the cost and delay to motorists during roadway construction and illustrate these through case studies.

D.2.2 – Improved Maintenance Methods

Identify and document improved maintenance methods for different types of pavements. Evaluate maintenance strategies and their use and report on the advantages of each.

D.2.3 – Road Noise Mitigation

Define legal requirements for road noise and evaluate noise reduction techniques.

D.2.4 – Monitoring of Innovation

Analysis of recent technologies for the construction and rehabilitation of pavements.
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D.2.5 – Adaptation to Climate Change

Document elements of roadway infrastructure that can be affected by climate change and identify methods to adapt to this change.

Summary of the Work Completed

D.2.1 – Reducing the Delay and Cost of Construction, WG Leader, Luc Rens, Belgium

Working Group D.2.1 was led by members from Subcommittee D2c with input from the remainder of Committee D2. It was determined that the most appropriate method of illustrating methods of reducing the delay and cost of construction was

through the use of case studies or other practical applications of products and methods for road construction. The working group determined that only methods/procedures to reduce construction time and cost that did not reduce the quality of the construction be considered. Further the “reduction” of cost was modified to the “optimization” of cost.

Input was solicited from both the members of the working group, general members of the overall D2 committee and colleagues from 11 countries. Overall, 20 relevant case studies including both rigid and flexible pavements were developed and documented in a technical report. The case studies include a description of the method/procedure, discussion and analysis of potential benefits and weaknesses and conclusions.

D.2.2 – Improved Maintenance Methods, WG Leader, Johan Lang, Sweden

This working group concentrated on maintenance techniques and management activities related to the delivery of road maintenance. The working group conducted a survey with a view to analyzing the existing strategies employed by the various agencies, identifying a list of management indicators, and studying the tracking of changes made to these strategies over time. In addition, the Committee examined the environmental impacts of strategies after the implementation of changes.

The second step consisted of analyzing the same information from the perspective of contracts involving partial or total outsourcing of works on the road network. Case studies that illustrated changes that have been made to strategies were then documented. The work addressed the management of maintenance operations carried out by the agency, while the impact of partial or total outsourcing of network maintenance management. In addition, a best practice guide on the maintenance of concrete pavement was produced.

D.2.3 – Road Noise Mitigation, WG Leader, Filippo G. Praticò, Italy

The topic of noise mitigation was explored through a PIARC noise questionnaire with the information obtained, summarized in a technical report. The working group examined the conceptual framework for managing road noise, tire-pavement noise fundamentals (mechanisms, main systems which act as source, mechanisms complexity and practical needs), several practical solutions (asphalt rubber friction course, poroelastic road surface, porous asphalt– single-layer, porous asphalt– two-layer, stone mastic asphalt, thin and ultrathin surfacing, surface dressing, porous concrete, exposed aggregate concrete, drag textures, diamond grinding, longitudinal tining). Finally, national and multi-national quiet pavement initiatives (European and multi-national overview, United States Overview) were described.

Based on the analyses the following key conclusions can be drawn:

- There are a number of national/international projects and research programs looking at reducing the physical impacts of environmental noise, developing innovative reduction measures and/or assessment schemes and/or reducing costs.

- There is a strong focus on source-related mitigation measures and an increasing emphasis on cost-effectiveness. Many solutions include proprietary products.

- It still remains crucial that knowledge and experiences are shared in order to permit innovations and products developed for use within specific member states may be equally beneficial/valid for use in a wider area.

- There is the need for the standardization of components and acoustic labelling for helping towards achieving the selection of the appropriate products.

- Due to the evolution of traffic spectrum, it becomes more and more relevant to include truck tire noise in mitigation research.

- Infrastructure sustainability is growing in interest, in the sense of a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The fact implies the opportunity of considering, in future projects, the combination of noise, air pollution and other environmental issues.

D.2.4 – Monitoring of Innovation, WG Leader, Francois Chaignon, Canada

The fostering, evaluation and implementation of innovation in road design and construction was explored by examining all of the innovation policies implemented by agencies with a focus on practical examples and experience in order to assist others in the development of existing or their own innovation strategies. The purpose of the monitoring of innovations strategy was to review the recent changes in construction and maintenance of road pavements to identify where innovations have been introduced towards improving roadway durability, recycling and re-use. In addition an assessment of the developments taking place in road administrations to foster innovation was completed.

A questionnaire on innovation needs was developed and circulated through the committee members to their respective countries. The purpose of the questionnaire was to develop an understanding of innovation needs that in the opinion of the country representatives were not being adequately addressed. The key questions asked in the survey were:

1. Does your country have a particular policy on innovation?
2. How are innovation needs defined and by whom?
3. Do you believe that it is necessary to foster innovation to address the following issues:
    i. Reducing availability of raw road building materials
    ii. Substitute products for bituminous binders
    iii. Adaptation to climate change
    iv. Environmental concerns and changing regulations
    v. Reduction of traffic disruption during road work
    vi. Performance levels
    vii. Innovation in calls for tender
    viii. Technology transfer

A total of 8 types of innovation policies were identified from the survey and the basic principles of innovation policies along with their advantages and disadvantages were summarized. It was found that innovation can ‘pave the way’ to making our engineers and contractors competitive on the world market while cost-effectively extending the service life of our transportation infrastructure while minimizing the impact of construction on the road users. By fostering collaboration between government agencies, industry and academia, it is possible to ‘partner’ to develop new policies, processes, and procedures to reduce time

and cost and improve the safety of our infrastructure. While innovation ultimately leads to a benefit, which can include a reduction in cost, it is important to recognize that an investment in innovation is necessary to achieve the ultimate benefits. This typically requires some basic fundamental research and partners who are willing to take risks to develop the innovation. These risks can be financial, technological and commercial.

When evaluating an innovation, it should be recognized that there is a variety of procedures for introducing an innovation and each may have its own benefits and risks. The alternatives presented provide a basis evolution of the phases to incorporate innovative policy, design and construction techniques and procedures into an agency's procurement and delivery process for transportation infrastructure.

The purpose of the monitoring of innovations strategy was to review the recent changes in construction and maintenance of road pavements to identify where innovations have been introduced towards improving roadway durability, recycling and re-use. In addition an assessment of the developments taking place in road administrations to foster innovation was completed.

The output of this committee working group includes a technical report, a seminar on pavement maintenance practices innovation which was held in Cancun, Mexico in August 2009 and a call for technical papers on innovation for the 2011 World Road Congress.

D.2.5 - Adaptation to Climate Change, WG Leader, Benoit Verhaeghe, South Africa

The majority of the scientific community is in agreement that increasing atmospheric concentrations of carbon dioxide and other greenhouse gases as a direct result of human activity is causing a global change in climate. Between 1906 and 2005, the global average near-surface air temperature increased by 0.74°C. It is expected that global average near-surface air temperature will further increase in the years to come, despite efforts to reduce greenhouse gas emissions through mitigation actions.

Climate change is highly likely and almost certain to result in reduced ice and snow coverage, changes in freeze-thaw cycles, rising sea levels, more frequent and intense storms, with rises in average surface temperature and more severe heat waves and prolonged droughts, directly impacting the performance of our infrastructure, depending on its location.

Climate change can have a direct impact on the performance of our transportation infrastructure. More frequent and intense rainfalls in certain parts of the world may result in flooding and higher groundwater levels, which in turn may lead to erosion, slope instability and reduced structural strength and bearing capacity of road structures. In other parts of the world, the structural strength of road structures may also decrease as a result of thawing of permafrost. Yet in other locations, roads may become exposed to higher incidence of freeze-thaw cycling which will accelerate pavement deterioration which results in increased maintenance costs. Conversely, increases in the ambient temperature may cause bituminous-bound materials to become susceptible to permanent deformation in the form of rutting. In the years to come, climate change will impact the way roads are planned, designed, constructed, operated and maintained.

The working group produced a document to sensitise the road sector to the likely impacts of climate change on road pavements and to provide guidance on how to go about:

1. Assessing the vulnerability of road pavements to the direct impacts of climate change, and;
2. Identifying and prioritising possible adaptation measures for road pavements that could be applied immediately or phased in over time, so as to avert the negative consequences of climate change on the serviceability of road networks.

In order to better understand the vulnerability of road pavements to the direct impacts of climate change, and to assess the degree of concern and level of readiness of the roads sector, a questionnaire was sent to PIARC members. Based on the responses received from 21 countries, it became clear that most countries were concerned about the levels of precipitation, where increased levels could cause flooding and impact on the structural integrity of pavements (and may necessitate the imposition of load restrictions), and decreased levels of precipitation could dry out the subgrade impacting on the overall durability of the pavement. Most coastal countries raised concern about rising sea levels which, when combined with storm surges, could lead to flooding and therefore also road closures. The likely increase in road closures as a consequence of landslides caused by higher precipitation levels was also raised. Several countries expressed concern about an increased frequency in the number of freeze-thaw cycles, leading to frost heave, cracking and potholing. With regard to increased temperatures, several countries, including those with cold winter conditions, raised concern about increased potential for rutting and bleeding in bituminous-bound pavement layers during summer.

The output of this committee working group includes a technical report where guidance is provided on how to conduct risk and vulnerability assessments, and on how to deal with the effects of climate change on road pavements and a call for technical papers on adaptation to climate change for the 2011 World Road Congress.

OTHER COMMITTEE ACTIVITIES

D2a: 6th Symposium on Road Surface Characteristics: Portoroz, Slovenia

Every 4 years PIARC organizes an international symposium on pavement surface characteristics for roads and airfields, the so-called SURF events. The first symposium was held at State College, Pennsylvania, USA in June 1988, followed by symposia in Germany (Berlin, June 1992), New Zealand (Christchurch, September 1996), France (Nantes, June 2000), and Canada (Toronto, June 2004). The success and interest shown in these symposia encouraged PIARC, together with Technical Committee TC 4.2 “Road/Vehicle Interaction” and the Slovenian PIARC National Committee, to organize the 6th International Symposium on Pavement Surface Characteristics of Roads and Airfields in 2008. SURF 2008 was held in Slovenia. SURF Symposia are official PIARC events, where the doors to partnership with different organisations can be opened. Traditionally, they take place every four years, in the year following PIARC's World Road Congress.

The Slovenian PIARC National Committee, the Technical Committee TC 4.2 “Road/Vehicle Interaction”, and the World Road Association-PIARC, together with all the Chairs of Committees D2, D2a, D2b and D2c, provided the best opportunity to discuss the latest developments in the pavement surface characteristics of roads and airfields. It was a unique opportunity for specialists to share their knowledge and experience. The Scientific Committee was chaired by Mr. Mathieu Grondin from Canada and was responsible for the quality level of the selected papers, whereas the Organising Committee used the opportunity of a challenge to organise the event after 5 successes and 70 years of tradition.

Signing the Agreement for SURF 2008 in October 2006 – PIARC Secretary General Jean Francois Corté and the Chairman of the Organising Committee, Bojan Leben

Of the 120 abstracts received, 80 were accepted and 50 papers invited for presentation.

The themes for the SURF 2008 Symposium reflect recent technological developments in pavement surface characteristics, and are of interest to researchers and practitioners. The development of new technologies in recent years has increased the amount of available data, offering new possibilities for road managers to accomplish their work more efficiently. The most recent developments in road assessment, along with expected future developments, were the key themes of the Symposium. The program was prepared with 14 sessions on 8 topics:

- Assessment of the pavement
- Data analysis tools
- Performance criteria
- Pavement management
- Assessment and management of unpaved roads
- Trends in vehicle-road interaction and their impact on design and management
- Others topics related to vehicle-road interaction

Slovenia First Delegate and Director of the Slovenian Roads Agency, Gregor Ficko.

Some of the 170 attendees from 39 countries.

In additional to the main event, an exhibition was organized, and meetings of the PIARC subcommittees and working groups in which 72 members participated. The workshop for the TYROSAFE project financed by the EC (http://tyrosafe.fehrl.org) was also part of the event, and finally the cultural evening with participants of the 9th Slovenian Road and Transportation Congress. The 7th SURF symposium is planned to be held in Norfolk, Virginia in 2012.

Seminar on Maintenance Techniques to Improve Pavement Performance, Cancún México

Subcommittees D2a and D2b assisted in organizing the 2009 PIARC International Seminar in Cancún, Quintana Roo, México with the central topic “Maintenance Techniques to Improve Pavement Performance”, with special emphasis and discussion on innovation, training and quality.

The seminar was attended by 198 professionals from primarily North, Central and South America with some attendees from Europe (primarily PIARC committee members) and Caribbean nations. It was very well organized and delivered. There were 31 technical papers and posters in the two day session. There was excellent participation from Mexico, Central and South America.

Workshop on Concrete Pavements in Seoul, Korea

A one-day workshop on Concrete Pavements was organized by Subcommittee D.2c and the PIARC Korean National Committee. The workshop was held in Seoul, Korea on October 7, 2009.

The workshop presentations included several topics of interest including the Korean pavement design program, presentations of practices in Belgium, France, Germany and USA and roller compacted concrete. A presentation on the comparison and performance of continuously reinforced and jointed plain concrete pavement in Korea was well received.

The workshop included more than forty attendees from Korea and ten from Subcommittee D2c. The presentations were made by the Korean participants as well as PIARC subcommittee members.

A field visit to the accelerated pavement test facility in the vicinity of Seoul was also organized. The visit provided insight into Korea’s research activities in pavements and an opportunity to develop contacts with key research personnel in Korea.

Seminar on the Latest Advancements in Concrete Pavement Design and Construction, Buenos Aires, Argentina

A seminar was held in conjunction with the PIARC Subcommittee D2c meeting in Buenos Aires on May 9-10, 2011. The seminar was hosted by the PIARC Argentina National Committee. The presentations were in English and Spanish and simultaneous translation was provided. The total number of seminar participants was more than 125 and the participants came from several countries including Argentina, Brazil, Mexico, Chile, Peru, Guatemala and Uruguay. Ten PIARC D.2.C committee members participated in the meeting and the seminar.

The workshop presentations included long-life pavements, continuously reinforced concrete pavements in Belgium, drainage of concrete pavements, sustainability of concrete pavements, surface characteristics, rehabilitation, Latin-American experience with concrete pavements and innovative technical solutions. The presentations were made by delegates from several countries as well as the PIARC delegates.

A field visit to several concrete pavement projects at the Buenos Aires International Airport and in the city, took place on May 11, 2011. The field visit was informative and allowed further interaction between the Argentine hosts and the international delegates.

Conclusions

The PIARC Committee D.2, Road Pavements is a large committee with responsibilities for all pavement types, characteristics, design, construction and maintenance. The committee produced five technical reports and technology transfer seminars in Cancun, Mexico, Seoul, Korea and Buenos Aires, Argentina. These seminars were well attended and well received by the participants.

The other activities of the Committee D.2 included organization of SURF 2008 Symposium in Slovenia. The Symposium was attended by 170 attendees from 39 countries. The organization of SURF 2012 Symposium in USA has been initiated by the PIARC Headquarters and Committee D.2 and an organizing committee has been formed. The D2c Subcommittee members also provided assistance for the EUPAVE Symposium in Seville, Spain in 2010.

The D2 Committee goals and activities outlined at the Paris meeting in 2008 have been achieved. The cooperation and extensive work by the Chairs, Secretaries and Members of the committee have resulted in excellent technical documents and successful technology transfer meetings, seminars and field visits.

TECHNICAL COMMITTEE D.3
ROAD BRIDGES

2008-2011 ACTIVITY REPORT

CONTENTS

COMMITTEE MEMBERS WHO CONTRIBUTED TO THE ACTIVITIES

Committee members and countries having contributed to the activities are as follows:

Satoshi Kasahima, Japan	Chair
Pierre Gilles, Belgium	Secretary (French)
Brian Hicks, Canada	Secretary (English)
Pablo Diaz Simal, Spain	Secretary (Spanish)

Group 1

Leader: Borre Stensvold, Norway	Member
Alessandro Contin, Italy	Corresponding Member
Brian Hicks, Canada	Member (Secretary)
Ebbe Rosell, Sweden	Corresponding Member
Gediminas Virsilas, Lithuania	Member
Malcolm T. Kerley, USA	Member
Philipp Stoffel, Switzerland	Member
Ravi Ronny, South Africa	Member
Timo Tirkkonen, Finland	Member
Toma Ivanescu, Romania	Member
Victor Popa, Romania	Member (Former Leader)

Group 2

Leader: Erica Smith, Australia	Member
Alberto Ascenzi, Italy	Corresponding Member
Alle Diouf, Senegal	Member
Alvaro Navareno Rojo, Spain	Member
Andres Torres Acosta, Mexico	Member
Dimitrios Konstantidis, Greece	Member
Geraldine Villain, France	Member
Henrik Nielsen, Denmark	Member
Ismail Bin Mohamed Taib, Malaysia	Member
Janos Karkus, Hungary	Member
Karel Dahinter, Czech Republic	Corresponding Member
Kiyohiro Imai, Japan	Associate Member
Liu Xu, China	Member
Louis-Marie Belanger, Canada-Quebec	Member
Maurizio Lieggio, Italy	Member
Pierre Gilles, Belgium	Member (Secretary)
Stephen Pottle, UK	Member
Vaclav Hvizdal, Czech Republic	Member

Group 3

Leader: Thierry Kretz, France	Member
Christian De Buysscher, Belgium	Member
Darren Kimberley, UK	Member
George Akhras, Canada	Member
Masahiro Yanagihara, Japan	Corresponding Member
Pablo Diaz Simal, Spain	Member (Secretary)

Countries having responded to the questionnaires prepared by Group 1:
Issue 3.4: Canada (New Brunswick, Ontario), Finland, Germany, Italy, Japan, Lithuania, South Africa, Switzerland, USA
Issue 3.5: Belgium, Finland, Germany, Italy, Japan, Lithuania, Norway, Slovenia, South Africa, Switzerland

Countries having responded to the questionnaires associated with Issue 3.1 and Issue 3.2 prepared by Group 2 : Australia (Queensland, South Australia, Victoria, Western Australia), Belgium, Canada (Alberta, New Brunswick, Ontario), Canada-Quebec, Denmark, Finland, France, Greece, Hungary, Italy, Japan, Mexico, Norway, South Africa, Spain, USA (Virginia)

Countries having responded to the questionnaires associated with Issue 3.1, Issue 3.2, and Issue 3.3 prepared by Group 3 : Australia, Belgium, Canada, Denmark, France, Germany, Greece, Japan, Sweden, USA

1. INTRODUCTION AND CONTENTS

1.1. Introduction

The purpose of this Activity Report is to present an overview of the work contributed by Technical Committee D.3 during the period of 2008-2011.

1.1.1. Technical Committee Meeting

Since the kick-off meeting in Paris, April 2008, the Committee has had 8 meetings. Each of them was organized by different Technical Committee members and supported by their respective governments, institutions, and organizations.

The date and place of eight meetings were as follows:

Meeting 1	April 2008	Paris (France)
Meeting 2	October 2008	Kuala Lumpur (Malaysia)
Meeting 3	May 2009	Helsinki (Finland)
Meeting 4	October 2009	Nanjing (China)
Meeting 5	May 2010	Quebec City (Canada-Quebec)
Meeting 6	October 2010	Bucharest (Romania)
Meeting 7	May 2011	Virginia (U.S.A.)
Meeting 8	September 2011	Mexico City (Mexico)

1.1.2. PIARC International Seminar

In response to PIARC recommendations, the committee devoted effort to organize two seminars in a developing or a transition country. One was held in Nanjing, China in October 2009, and the other seminar was planned to be held in Santo Domingo in the Dominican Republic in March 2011. However, the second seminar in the Dominican Republic was cancelled two months before the expected date.

Summary of the seminar held in Nanjing, China is as follows:

Title: International Seminar on Concrete Bridges
Date: 22nd – 24th October 2009
Place: Nanjing, Jiangsu Province, China
Organized by Ministry of Transport of China and PIARC Technical Committee D.3
Undertook by Jiangsu Provincial Communications Department and CCCC Highway Consultants Co. Ltd (HPDI)
Supported by Jiangsu Transportation Research Institute, China Technology Transfer Center, China Research Institute of Highway, and Ministry of Transport

All participants in the Seminar in Nanjing, China

1.1.3. Technical Committee Reports

Technical Committee D.3 prepared four reports for assigned issues as follows:

- “Inspector Accreditation, Non-destructive Testing and Condition Assessment for Bridges” “LARGE ROAD BRIDGES: Management, assessment, inspection, innovative maintenance techniques”
- “Management of bridge stock”
- “Adaptation to climate change”

These four reports were based on the works by three working groups for four year periods. The four reports will be published in 2011 and the details of four reports will be presented during the World Congress in Mexico.

1.1.4. Papers in Routes/Roads;

Based on the technical report, “LARGE ROAD BRIDGES: RISK ANALYSIS AND MONITORING” is published on Routes/Roads 351.

1.1.5. Others

At the Symposium on the Advancement of Structure Research in Québec (Québec City, 10 May 2010), TC D.3 works were presented by three group leaders.

1.2. Contents

This Activity Report includes the list of active committee members, the list of meetings arranged during the four year period, comments concerning the three work groups for the five issues assigned by PIARC, a synthesis of the work and conclusions and recommendations. The work program, which was prepared by the Committee and which directed the committee's work, is presented in Figure 1.

Year / Work Item	2008			2009												2010												2011				
	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Meeting	x							x					x							x					x							x
Seminar													x																			
Development of work plan	x																															
Preparation of table of contents		x	x	x	x	x	x																									
Sourcing information								x	x	x	x	x	x																			
Prepare first draft														x	x	x	x	x	x	x												
Review period																				x	x	x	x	x								
Final draft																									x	x						
Translation																											x	x				
Review of translation for accuracy with original																													x			
Submission to PIARC General Secretariat																														x	x	x

Figure 1: Work Program

2. FIVE ISSUES, THREE GROUPS, AND COMMITTEE'S WORKS

During this working period, five issues were assigned to the Technical Committee by PIARC as follows:

- Issue D.3.1: Inspections and non-destructive condition surveys
- Issue D.3.2: Assessment of the condition of road bridges
- Issue D.3.3: Innovative maintenance techniques
- Issue D.3.4: Management of the bridge stock
- Issue D.3.5: Adaptation to climate change

Each issue had strategies and outputs prepared by PIARC.

Based on vigorous discussions during the kick-off meeting in Paris, it was decided that three groups would be established to address the five issues. Group leaders were nominated from among the group members. Five issues were assigned to each group as follows:

Group 1: Management of bridge stock and adaptation to climate change
Issue D.3.4: Management of the bridge stock
Issue D.3.5: Adaptation to climate change

Group 2: Inspection and condition assessment
- Issue D.3.1: Inspection and non-destructive condition surveys
- Issue D.3.2: Assessment of the condition of road bridges

Group 3: Large scale bridges
- Issue D.3.2: Assessment of the condition of road bridges
- Issue D.3.3: Innovative maintenance techniques

Kick-off meeting in Paris, France

During the 2nd meeting in Kuala Lumpur, drafts of questionnaires were discussed.

2nd meeting in Kuala Lumpur, Malaysia

At the 3rd meeting in Helsinki, the final format of the questionnaires was discussed in order to finalize them for distribution. It was confirmed that the questionnaires would be distributed and responses received before the 4th meeting in Nanjing.

3rd meeting in Helsinki, Finland

Each group received responses from member countries and discussed the responses during the 4th meeting in China. In addition, the contents of the final reports were discussed.

4th meeting in Nanjing, China

At the 5th meeting in Quebec Canada, the organization and content of the final reports was discussed. It was confirmed that four reports would be prepared as follows:

- Report 1: Inspector Accreditation, Non-Destructive Testing and Condition Assessment for Bridges
- Report 2: Large road bridges, management, assessment, inspection and innovative maintenance techniques
- Report 3: Management of the bridge stock
- Report 4: Adaptation to climate change

The relation between the four reports and five issues can be presented as follows:

	Report 1 (Ordinary Bridges)	Report 2 (Large Bridges)	Report 3	Report 4
Issue D3.1: Inspection and non-destructive condition survey	X	X		
Issue D3.2: Assessment of the condition of road bridges	X	X		
Issue D3.3: Innovative maintenance techniques		X		
Issue D3.4: Management of the bridge stock			X	
Issue D3.5: Adaptation to climate change				X


5th meeting in Quebec City, Canada-Quebec

At the 6th meeting in Bucharest, Romania, responsibility for translation and quality control was assigned to the following members:

	English	French
Report 1 (Group 2)	**Erica Smith**	**Pierre Gilles**
Report 2 (Group 3)	**Brian Hicks**	**Thierry Kretz**
Report 3 Report 4 (Group 1)	**Borre Stensvold**	**Brian Hicks Philipp Stoffel**

It was confirmed that all three groups were to prepare final reports, review them and translate them into French before the next meeting.


6th meeting in Bucharest, Romania

TC D.3 Road Bridges Committee Members and their Contributions

Name		Status[1)]	Country	Group	Attendance to Meetings[2)]						
					1st	2nd	3rd	4th	5th	6th	7th
	Rafael.Astudillo	Former Chair	Spain		O	-	-	-	-	-	
1	Satoshi KASHIMA	Chair	Japan		O	O	O	O	O	O	
2	Pierre GILLES	Sec. (F)	Belgium	2	O	O	O		O	O	
3	Brian HICKS	Sec.(E)	Canada	1			O	O	O	O	
4	Pablo DIAZ SIMAL	Sec.(S)	Spain	3	O	O	O	O	O	O	
5	Abdelfattah MOBARRAA	C.M.	Morocco	2							
6	Alberto ASCENZI	C.M.	Italy	2		O	O				
7	Ales ZNIDARIC	M.	Slovenia	1							
8	Aliasghar NAZARISHARBIYANI	A. M.	Iran								
9	Alle DIOUF	M.	Senegal	2	O						
10	Alessandro Contin	C.M.	Italy	1		O					
11	Alvaro NAVARENO ROJO	M.	Spain	2	O	O			O		
12	Andres TORRES ACOSTA	M.	Mexico	2							
13	Borre STENSVOLD	M.	Norway	1	O	O	O	O	O	O	
14	Chan-Bum Park	C.M.	Korea								
15	Chan-Min Park	C.M.	Korea								
16	Christian DE BUYSSCHER	M.	Belgium	3	O						
17	Darren KIMBERLEY	M.	UK	3	O						
18	Dimitrios KONSTANTINIDIS	M.	Greece	2	O	O	O		O		
19	Ebbe ROSELL	C.M.	Sweden	1	O						
20	Eihman SISSAKO	M.	Mali								
21	Erica SMITH	M.	Australia	2	O	O	O	O	O	O	
22	Estelle AMOUYAL	M.	France	1							
23	Francis NZASSA-EKASSA	M.	Congo								
24	Gediminas VIRSILAS	M.	Lithuania	1	O	O	O			O	
25	George AKHRAS	M.	Canada	3	O						
26	Geraldine VILLAIN	M.	France	2	O	O	O		O	O	
27	Gustavo SILVA	M.	Chile								
28	Gyula KOLOZSI	C.M.	Hungary								
29	Henrik NIELSEN	M.	Denmark	2	O	O	O	O	O	O	
30	Ismail BIN MOHAMED TAIB	M.	Malaysia	2	O	O					
31	Issa OUATTARA	M.	Côte d'Ivoire	1							
32	Jacky Delphin	C.M.	Madagascar								

	Name	Status[1)]	Country	Group	Attendance to Meetings[2)]						
					1st	2nd	3rd	4th	5th	6th	7th
	RAZAFINDRABE										
33	Janos KARKUS	M.	Hungary	2	O	O		O	O		
34	Joseph BIKOUMOU	C.M.	Congo								
35	Karel DAHINTER	C.M.	Czech Rep.	2					O		
36	Karim JALALIAN	C.M.	Iran	2							
37	Keith Foster	M.	Canada								
38	Khalid ABDELLAOUI	M.	Morocco								
39	Kiyohiro Imai	A. M.	Japan	2	O	O	O	O	O	O	
40	Kouassi Jean-Claude KOUASSI	M.	Côte d'Ivoire								
41	Lin XU	M.	China					O			
42	Louis-Marie BELANGER	M.	Canada-Quebec	2	O	O	O	O	O	O	
43	Ludovit NAD	C.M.	Slovakia								
44	Malcolm T. KERLEY	M.	USA	1			O		O		
45	Mame Amar FAYE	M.	Senegal	2							
46	Masahiro YANAGIHARA	C.M.	Japan	3	O	O	O	O		O	
47	Maurizio LIEGGIO	M.	Italy	2	O	O	O	O		O	
48	Mostafa TABATABAEI-MOGHADDAM	M.	Iran								
49	Myint LWIN	M.	USA								
50	Nikolaos MALAKATAS	M.	Greece								
51	Peter GRAHAM	C.M.	Australia								
52	Philipp STOFFEL	M.	Switzerland	1			O		O	O	
53	Pierrot RAZAFIMANDIMBY	C.M.	Madagascar								
54	Raul ROGES FABREGAS	C.M.	Cuba								
55	Ravi RONNY	M.	South Africa	1	O	O		O	O	O	
56	Robert DAO	M.	Mali								
57	Roberto Angel Maglie	M.	Argentina								
58	Ruben FRIAS ALDARACA	C.M.	Mexico								
59	Sh. T. B. Banerjee	C.M.	India								
60	Shri Ashok Kumar	M.	India								
61	Stephen POTTLE	M.	UK	2	O						
62	Takashi TAMAKOSHI	C.M.	Japan	2							
63	Thierry KRETZ	M.	France	3	O	O	O	O	O	O	
64	Tim LONNEUX	M.	Belgium	2							
65	Timo TIRKKONEN	M.	Finland	1	O	O	O	O	O	O	
66	Toma IVANESCU	M.	Romania	1	O	O	O			O	
67	Vaclav HVIZDAL	M.	Czecho	2		O	O	O			
68	Victor POPA	M.	Romania	1	O	O	O	O		O	
69	Walter WILSON ROJAS	M.	Chile								

Note:

1) Sec. (F): French speaking secretary, Sec. (E), English speaking secretary, Sec. (S): Spanish speaking secretary, M: Member, C.M.: Corresponding member, A. M.: Associated member

2) “O” indicates participation in TC D.3 meetings.

3. WORKING GROUP 1 AND ITS APPROACH

Group 1 undertook two issues including “Management of the bridge stock” and “Adaptation to climate change”. Two questionnaires were prepared and distributed to bridge authorities in member countries of PIARC Technical Committee D.3 – Road Bridges. Based on the responses, two reports were prepared by Group 1. The approach taken in preparing the two reports is as follows:

3.1. Management of the bridge stock

Bridges are valuable and costly elements of a country’s inventory of transportation infrastructure. Some countries manage their inventory at the national level, others at the state or provincial level, while others have introduced Public Private Partnerships (PPP’s) for this purpose. Some countries have extensive networks of bridge infrastructure while others have a more limited number of bridges under their responsibility. Of the countries surveyed, the majority of the bridges are concrete in design whereas the United States and Japan have substantially steel bridges in their inventory.

Regardless of the number of bridges in a country’s inventory, it appears that most have developed bridge management systems. These systems include bridge inspection, maintenance, rehabilitation and sometimes design. Some countries maintain the data themselves, while others employ external consultants. Most jurisdictions use their Bridge Management System (BMS) to prioritize the maintenance and rehabilitation program.

The work of Issue D.3.4 “Management of Bridge Stock” Group 1 of TC D.3 “Road Bridges” was to assess the different approaches used to prioritise management action of bridges for a range of road administrations. Group 1 developed a work plan, prepared a detailed questionnaire, analysed the responses and documented its findings, including small and large scale structures, with comments on costs and skills required for management.

Responses from the countries surveyed also highlight several measures that could help in the prioritization of bridge projects. The experience and training of inspectors is critical to a successful implementation, as well as the ease of understanding and usage by decision makers.

3.2. Adaptation to climate change

Climate change has now become a global issue of concern and it is for this reason that PIARC has incorporated it into the strategic themes and technical committees for the term 2008-2011. Higher levels of carbon-dioxide as part of greenhouse gas emissions are being released, resulting in heat being trapped in the atmosphere, which over time will result in a rise in the earth’s air temperature. This rise in temperature will filter into the oceans causing sea water to expand and therefore raise sea levels. There are already signs of extreme weather conditions occurring in certain parts of the world resulting in events such as drought, flooding, typhoons, earthquakes and tsunamis. The frequency of some of these events is also increasing.

At the Copenhagen Summit held in December 2009, a global agreement on climate change could not be reached and therefore it is most likely that current carbon-dioxide emissions will continue. Under Strategic Theme D (Quality of Road Infrastructure), issues of extreme weather conditions impacting on the design and management of assets is being addressed. With regard to road bridges, the extreme day and night air temperatures causing expansion and contraction of bridge superstructures, frequency and intensity of rainfall (causing major flooding) are of concern. Therefore, there is a need to review existing design codes related to flood return periods, extreme wind patterns that effect the design return periods, and the intensity and frequency of earthquakes with the secondary effects being landslides or tsunamis. Scour control is also another aspect that needs consideration.

The study therefore investigated how various countries define climate change and policies they may have in place, cases of extreme weather conditions experienced and whether this has resulted in a change in design methodology of bridge stock. Responses were received via a questionnaire that was circulated to various countries. The responses will assist in understanding the impact of climate change and its effect on design, construction and maintenance of bridge infrastructure.

Thirteen countries or states from five continents responded to this study. Their networks range from a few hundred kilometres to tens of thousands of kilometres and contain a substantial number of bridges. In general, there are extreme natural events being experienced in many countries resulting in loss of lives and loss or damage to infrastructure. More importantly however, most countries cannot substantiate that these events are as a result of climate change.

The data collected during the study is summarized and comments on the developments from the various countries are provided.

4. WORKING GROUP 2 AND ITS APPROACH

The goal of PIARC, Theme D is to improve the quality of road infrastructure through the effective management of assets in accordance with user expectations and managers' requests. While new technologies, social and environmental developments are expanding the sphere of interest for road authorities, infrastructure and management of assets remains their core business. The need for more efficient use of funds requires constant improvement in techniques in terms of the design, management and maintenance of assets.

The report was written to satisfy the following Technical Committee D.3 strategic plan issues:

- Issue D.3.1 – Inspections and non-destructive condition surveys; and
- Issue D.3.2 – Assessment of the condition of road bridges.

The first issue relates to the non-destructive testing techniques utilized throughout the world, their uses, advantages and disadvantages to form a best practice guideline for publication. The aim was to produce an assessment of the most effective regimes for structural inspections, identifying the key elements of the inspection process and report on the most effective techniques for non-destructive testing of different structural elements, taking into account costs, complexity and safety.

The second issue relates to the assessment procedures based on the detailed inspection, education and accreditation regimes for bridge inspectors to ensure both consistency of results and safety of inspectors. The aim was to summarise the information on available accreditation courses to ensure that two different inspectors performing an inspection of the same bridge will give similar results and to document the different bridge condition assessment procedures.

Data was collected using literature research and the results of a questionnaire sent to bridge authorities in all member countries of PIARC Technical Committee D.3 – Road Bridges. A questionnaire was sent by working group 2 to identify the different inspector accreditation programs, non-destructive testing techniques and condition assessment approaches used by various road authorities.

A total of 22 responses to the questionnaire were received from local road administrations in 15 different countries. The data collected during the study are grouped, summarised, analysed and evaluated as presented in the final report.

Group 2 of Technical Committee D.3 completed a study which presents and compares the qualification process for the inspection of road bridges, the types of non-destructive testing techniques utilised to determine key characteristics for different bridge materials and the condition assessment of road bridges in different countries or regions. These are all important components of an overall bridge management system to ensure appropriate asset management and bridge management activities.

The inspector education and qualification programs are compared using a number of criteria including admission requirements, duration, content of specific courses and requalification standards.

Non-destructive tests are categorised for different material types and further by the specific problem they are trying to address (e.g. detection of broken cables, crack detection or hardness). The purpose of the test is explained with images from the test itself or output results from the test. Comparison is made between the possible tests with recommendations on the most appropriate non-destructive test techniques to adopt to reliably, economically and safely derive the specific material characteristic.

Condition assessment activities are compared using a number of factors including damage catalogues, condition assessment procedures, element ratings/scores, overall bridge or global ratings/scores and use of these ratings.

5. WORKING GROUP 3 AND ITS APPROACH

In order to deal with specific problems of large bridge management, Group 3 prepared a questionnaire that was disseminated among PIARC members, with these specific objectives:

- to collect information on large bridge maintenance and condition assessment with special attention on cable stayed and suspension bridges ;
- to collect specific information on innovative maintenance and rehabilitation techniques.

The aim of the questionnaire was to collect data on individual large bridges. The questionnaire was addressed to owners of large bridges, or to responsible persons or companies in charge of maintenance and to companies involved in large rehabilitation works.

Group 3 received ten answers concerning the management of specific large bridges and one answer concerning a large suspension bridge rehabilitation work. This information was analysed and synthesised, and the group 3 report on large bridge management includes:

- a presentation of the general principles of large bridge management;
- case studies as examples of good practices; and
- more detailed information on innovative maintenance and rehabilitation techniques.

6. CONCLUSIONS

Following the work developed by the committee in the five issues, some conclusions can be presented according to four reports:

- Inspector Accreditation, Non-Destructive Testing and Condition Assessment for Bridges

The report produced by Group 2 was researched and written to satisfy strategic plan issues related to inspections and non-destructive condition surveys and the assessment of the condition of road bridges. Both issues are intrinsically linked to the PIARC goal of Theme D to improve the quality of road infrastructure through the effective management of assets in accordance with user expectations and managers' requests. Infrastructure and management of assets remains core business for all road authorities and the need for more efficient use of funds requires constant improvement in techniques in terms of the design, management and maintenance of assets.

Inspector Accreditation

Recognizing and understanding that a detailed inspection process is the key to gathering information about the condition of the bridge network, a training course is considered essential for qualification of inspectors. This educational process, a theoretical course with some practical training is seen as an essential requirement to achieve consistent inspection data collected by diverse personnel.

It is recommended that detailed bridge inspection be the responsibility of an experienced civil engineer, with use of specialized technicians and external resources with appropriate bridge experience employed as needed. The course itself should be a minimum of 2 days, incorporating practical inspection training on actual bridge sites. To complete full accreditation it is recommended that inspection of a certain number of bridges, of different types, be completed and certified by the responsible bridge authority. A requalification procedure is considered a mandatory component of any training and accreditation system to ensure the continued quality of the inspection process.

In an ideal world, the detailed bridge inspection process should be performed in an apprenticeship manner. Perhaps this is possible in some circumstances, but with the speed and the constraints of the actual world, the growing and ageing bridge stocks and declining bridge maintenance funding, it is not often feasible. This is why a quality detailed inspection training program combined with a continuous quality control process (as an audit) and a requalification process are all essential. It is imperative to trust or to have a high degree of confidence in the initial technical data generated in the management process, and on which other human resources will count on afterwards in the analysis and decision-making.

Non-Destructive Testing

Further inspection data, beyond that provided in the detailed visual inspection, is essential in order to know the condition of the bridge network and to plan judicious interventions in order to improve condition. Non-destructive testing (NDT) is one tool for the bridge inspector to provide reliable, quantitative information on the current bridge condition.

Recommended NDT methods have been proposed for each main bridge material to solve the various problems encountered in bridges of their construction. However, it should be noted that the range of problems may be very wide and it is difficult to propose a best method to cover all problems and situations. Although these recommendations are based on assessment of 22 questionnaire responses and aim to reflect the most effective techniques for non-destructive testing of different structural elements, each organisation must consider their own needs in relation to costs, complexity, laboratory testing facilities, reliability of data, access to technical experts and specialist technologies, portability of equipment and direct application of results.

Irrespective of the recommendations and the choice made by each individual organisation based on an assessment of their needs, it is important to bear in mind that most NDT methods do not measure aspects directly but rely on calibration and validation in order to make structural conclusions. Successful implementation of any NDT technology requires management support, extensive training, calibration and technology transfer. These implementation considerations must be addressed effectively if any NDT is to be used successfully. Further, it must be recognised that many NDT methods are useful only in mapping a bridge for identification of defects with specific recommendations for further destructive testing.

Condition Assessment

Condition assessment of bridges is an essential part of an overall system of bridge management. Understanding that the detailed inspection process is the key to gathering information about the condition of the bridge network, the rating of bridge elements is considered essential for determination of overall bridge condition. A standardized approach to condition assessment then provides a logically consistent framework for management decision support and communication of bridge inventory performance.

Organizations need to devise a condition assessment procedure to suit their uses of the information but certain recommendations have still been made. Damage catalogues are considered the most effective means to ensure unambiguous assignment of condition states. Condition states should only be assigned to the major structural elements with element scores considering the extensiveness and severity of the damage as well as the progression of the damage (deterioration) and the performance of the element in service. It is recommended that one element rating system is adopted for all elements with at most five scores for condition assessment. An overall rating calculated according to the weighted sum of the individual rated elements is considered to be the best approach for determination of the global condition rating.

In the current environment of limited funds for bridge replacement and maintenance, it is important to have objective data to be able to demonstrate decline in bridge health and support the fact that timely maintenance intervention over a long period is most cost effective. The use of condition assessment ratings helps fill these needs. Condition assessment also forms the basis for the estimation of possible interventions and for estimation of costs for possible remedial work.

However, it is important to realize that the inspection data compiled in thousands of reports are the results of human judgment. Bridge inspectors judge the performance, stability and the structural performance of critical elements for the assignment of condition states. For this reason it needs to be kept in mind that although the overall score determined by calculation appears objective it is in fact made up of many subjective elemental scores. The principles behind condition assessment provide a solid foundation to advance the state of the art in maintenance management. However, the use of condition assessment element or global ratings should always be considered a tool only with individual and expert engineering judgment applied to the results in the determination of the most effective bridge management activities.

- Regarding Large road bridges, management, assessment, inspection and innovative maintenance techniques

The report is based on the answers received to a questionnaire disseminated through PIARC TC D3 members to owners and managers of large bridges. It describes the management organization of 10 large bridges, located in several countries and representing different structural types: cable stayed bridge, suspension bridge, large steel truss of different shapes (arch, cantilever beam), large prestressed concrete box girder, steel or concrete beams.

It appears that for most large bridges, a Specific Authority is in charge of the management and that safety, serviceability and durability requirements are more stringent than on standard bridges. Concerning safety, it appears that a risk analysis is done implicitly or explicitly to foresee and mitigate the risks. Concerning serviceability and durability requirements, it appears convenient to introduce the terms of "Conditional Preventive Maintenance" and "Maintenance for durability" to explain how these requirements are taken into account.

In order to act preventively and to achieve the serviceability requirements, it is necessary to have a precise knowledge of the bridge health. Then, specific assessment procedures and monitoring systems are used on large bridges, in order to check continuously or at given intervals the constitutive materials, components and the structure behaviour.

Large bridges are very expansive assets that are built for a sustainable future. The very notion of life cycle is inappropriate for theses structures. In fact, we should assume that they are built forever. Recent progress in steel and concrete materials and in the knowledge of their ageing processes make it possible to consider a one thousand life span, rather than the usual one hundred life span.

But three conditions are to be met:

- Very careful design of the structure and choice of materials, based on an risk analysis and on the integration of the management constraints, including the replacement of all components whose life span is limited

- Good execution
- A modern asset management approach, based on the concept of preventive maintenance as described in this article and on the usage of intelligent monitoring techniques to provide accurate information on materials, components and structural health and on their ageing.

- Regarding Management of the bridge stock:

Bridges are valuable and costly elements of a country's inventory of transportation infrastructure. Therefore a systematic and comprehensive approach for managing the assets is essential for both owner and user.

Twelve countries, states or agencies from five continents participated in the study which included responses to the questionnaire developed by the committee. Regarding the funding and based on international experiences a value of about 1 to 1.5% of the replacement value of the bridge infrastructure is recommended for yearly bridge maintenance and inspection activities. This common value could not be validated by the answers of the questionnaire.

The survey showed also that Bridge Management Systems (BMS) are currently used in all countries responding to the questionnaire although they manage very different sizes of bridge inventories. It can therefore be concluded that a BMS is an important management tool to facilitate cost effective decision making in preservation of bridge assets.

An effective use of a BMS has to be based on the quality of the inspection method and the currency of the data. Therefore the experience and training of the inspectors are critical to the successful implementation as well as the ease of understanding and usage by decision makers.

As possible future work, the committee recommends to study the existing reports on BMS especially whether there has been any development in the direction of asset management. Prepared by Group 1

- Regarding Adaptation to climate change:

Climate change is related to long-term relations (i.e. decades, centuries). It appears that both natural ("internal") and human activity-based ("external") forces influence the range of the effects mainly linked with climate change. The present result of the classical question and answer framework showed that for more or less "new" issues new ways in gaining information should be tested. Workshops in collaboration with international experts promise better findings.

To provide a capability of bridges to adapt to the effects of climate change is certainly the goal of bridge owners worldwide, although the different age within the bridge stock makes it very difficult to decide how to act on existing bridges and how to design new ones. Deficiencies of existing structures are almost never caused by effects of climate change only, whereas design rules for new construction often do not treat effects of climate changes separately. Preventive measures for new construction to adopt them seem to be easier to develop.

Nevertheless, the exposure of climate change will certainly lead to the need for a deeper understanding of different effects caused by climate change on bridge structures. This could be a further work to be investigated in the next PIARC term 2012-2015.

TECHNICAL COMMITTEE D.4
GEOTECHNICS AND UNPAVED ROADS

2008-2011ACTIVITY REPORT

SUMMARY

LIST OF COMMITTEE MEMBERS HAVING CONTRIBUTED TO THE ACTIVITIES

Martin SAMSON	Canada	Chair
Jean-Claude AURIOL	France	French Secretary
Alex KIDD	United Kingdom	English Secretary
Paul GARNICA ANGUAS	Mexico	Spanish Secretary
Bernard DETHY	Belgium	Co-leader of the theme 4.1
Guy RAOUL	France	Co-leader of the theme 4.1
David Têlé OLODO	Benin	Responsible theme 4.2
Aurèle PARRIAUX	Switzerland	Responsible theme 4.3
Youssouf BERTHE	Mali	Member
Enrique Garcia DAPENA	Spain	Member
Vitezslav HERLE	Czech Republic	Member
Dirk HEYER	Germany	Member
Adamou IDI	Burkina Faso	Member
Amédé KOUAKOU	Ivory Coast	Member
Otto LEIBNIZ	Austria	Corresponding member
Ahmad MANSOURIAN	Iran	Member
Anastasios MOURATIDIS	Greece	Member
Lovisa MORITZ	Sweden	Corresponding member
Ana PETKOVSEK	Slovenia	Independent contributor
Fabrizio RUSSO	Italy	Member
Eleni SAKOUMPENTA	Greece	Member
José Luis RODRIGUEZ	Spain	Member
François TOLLO	Benin	Member
Katarina ZGUTOVA	Slovakia	Corresponding member

1. WORK PROGRAMME

The Technical Committee D4 is part of the Strategic Theme D - Quality of road infrastructure - which aims to improve the quality of road infrastructure through effective management of road assets, and in line with the expectations of users and management requirements.

For the session 2008-2011, the terms of reference of the TC D4 included three themes:

- Theme 4.1: Innovations in processing and use of local materials
- Theme 4.2: Innovations in construction and maintenance of unpaved roads in developing countries
- Theme 4.3: Climate Change Adaptation

The following tables describe the work plan of the committee on these three themes.

Table 1. Work programme of Technical Committee D4 for 2008-2011

Issue: 4.1 Innovations in processing and use of local materials		
Description of the strategies chosen	The committee chose to address this issue by sending all members a questionnaire on the use of local materials in road works. In addition, a literature search was made on innovations undertaken in recent years for the enhancement of local materials.	
Facilitators of the working group	Guy Raoul (France) and Bernard Dethy (Belgium)	
Cooperation within PIARC	N / A	
Cooperation with other organizations	TREMTI, Earthworks in Europe	
Results		**Calendar**
Technical Report	The committee plans to prepare a summary report of the investigation giving examples of good practice. The working title is "Innovative approaches for the use of local natural marginal materials ". The report will provide advice on innovative approaches that can be used to promote the use of local materials in embankments and unpaved roads.	Published for the World Congress
Articles	No plans yet	
PIARC International Seminars	No	
Meetings at XXIV World Congress of the road	Presentation of survey results at the technical session of the Committee D.4 World Congress. Formulation of general recommendations to promote the optimal use of local materials.	Technical session at the World Congress
Other Events	Active participation of members of D.4 at the second symposium on earthworks in Europe held in London in June 2009. Alex Kidd, English secretary of D4 Committee, was the technical chair of the seminar.	3-4 June 2009
Aspects relevant to developing countries and countries in transition		
The value of reuse or optimizing the use of natural materials available locally is most relevant for developing countries and those in transition that do not always have the financial resources to replace materials with marginal properties. Similarly, innovations in treatment will maximize the reuse of soils that otherwise would be removed from the site.		

Issue: 4.2 Innovations in construction and maintenance of unpaved roads in developing countries		
Description of the strategies chosen	The committee chose to address this issue by organizing two international seminars, the first in an African country and the second in Central America or South America. The result of these activities will be presented during the technical session of the committee at the World Congress.	
Convenor of Working Group	The committee decided to appoint a project manager for each of the two seminars based on their location. For the first seminar held in Benin, Mr. David Olodo, representative of Benin on the committee acted as chair of the organizing committee of the seminar. Mr. Martin Samson, Canada, Chair of D.4 oversaw the collaboration committee D.4 and chaired conference sessions. The second seminar to be held in a country in South America did not take place owing to lack of a proposed host country. Alternatives were considered in Asia but without success.	
Cooperation within PIARC	N / A	
Cooperation with other organizations	AGEPAR for organizing the seminar in Benin.	
Results		**Calendar**
Technical Report	Since only one seminar took place, it was decided not to produce a summary report but rather to communicate the conclusions of the seminar in Benin during the D4 committee session at the world congress.	Communication in the World Congress
Articles	No	
PIARC International Seminars	Seminar in Benin in October 2009. The reports are available on the PIARC website.	October 2009
Meetings at XXIV World Congress of the road	Presentation of the main conclusions of the seminar at the technical session of the committee.	Technical session under the World Congress
Other Events	None at the moment	
Aspects relevant to developing countries and countries in transition		
This theme is specifically oriented towards the concerns of developing countries and those in transition. The strategies aim to reach a maximum number of local stakeholders in order to guide the discussions to their priority concerns.		

Issue: 4.3 Climate Change Adaptation		
Description of the strategies chosen	This topic has been addressed and partially dealt with during the previous session (publication of a report). For this session, the Committee wished to continue its work on this theme by drawing more on the anticipated effects of climate change by region and the probable consequences.	
Convenor of Working Group	Aurele Parriaux (Switzerland)	
Cooperation within PIARC	A collaboration was planned with the Technical Committee D2 but in the event failed to materialise.	
Cooperation with other organizations	No	
Results		**Calendar**
Technical Report	This topic will be a technical report.	Publication at the World Congress
Articles	Coming.	
PIARC International Seminars	A seminar in Indonesia in May 2011 was cancelled by the organizing committee.	
Meetings at XXIV World Congress of the road	Overview of key findings at the technical session of the committee.	Technical session under the World Congress
Other Events	No	
Aspects relevant to developing countries and countries in transition		
Although the issue of climate change appears not to be a priority at the moment for many road authorities in developing countries and those in transition, each day brings new evidence of the effects of these climatic changes. Adaptation to climate change will be key in the future to ensure sustainability of road works.		

2. D4 COMMITTEE ACTIVITIES

2.1 Theme 4.1: Innovations in processing and use of local materials

During the session 2008-2011, the Technical Committee D4 undertook to improve knowledge on the topic of the optimal use of materials found on the site of road projects. This is a recurring problem that the technical reports of previous sessions have already highlighted.

The issue of exploitation of local marginal materials demands an innovative approach, adapted technical specifications and new methodologies driven by feedback. This is where TC D4 wanted to extend and expand knowledge through exchanges between member countries using a survey undertaken for this purpose.

The survey objectives were:

- a wide-ranging and informative inventory of the families of natural “marginal” materials locally encountered in the different member countries;
- to share technical solutions, planned or implemented for use and / or improvement of these materials;
- to share feedback and innovation;
- to discuss methods and implemented specifications applied to this type of material;
- define how to understand and manage risks;
- to highlight the innovative techniques and methods used and / or planned;
- to identify target performance and how to measure it.

This survey was launched on November 21, 2008 (see Annex 1) to all members and corresponding members of the committee, with some 30 countries represented. The aim expressed in this communication was to have all the responses ready for the working meeting of the TC D4 be held in London in June 2009, at the 2nd International Seminar on Earthworks in Europe (3 and 4 June 2009).

On September 29, 2009, a request for additional information (see Appendix 2) relating to the inquiry was sent to all members of the Committee, in order to validate the results at the meeting in Cotonou (Benin) the occasion of the PIARC International Seminar on Geotechnics and Unpaved Roads (29 to 31 October 2009). At the end of the Cotonou meeting, November 9, 2009, a reminder was sent to members who had not yet responded to the survey in order to collect responses before December 31, 2009.

This request was reissued a second time on March 24, 2010, before the Committee meeting in Paris on 17 and 18 June 2010.

Finally, a final review of responses was undertaken at the Committee meeting held in Montreal on 15 and 16 November 2010. To date, responses from 21 countries have been registered on the site PIARC Technical Committee-D4. Responses were received from the following countries listed by continent:

- Europe: Austria, Belgium, Spain, France, Great Britain, Greece, Italy, Slovakia, Slovenia, Sweden, Switzerland and Czech Republic;
- Africa: Benin, Ivory Coast and Mali;
- America: Bolivia, Brazil, Canada and Mexico;
- Asia: Iran.

A summary report on this subject is being prepared and will be published shortly.

2.2 Theme 4.2: Innovations in construction and maintenance of unpaved roads in developing countries

The committee chose to address this issue by organizing an international seminar in an African country particularly concerned with the issue of development and maintenance of its unpaved roads.

The seminar was held on 29, 30 and 31 October 2009 at the Palais des Congrès in Cotonou, Benin. It was attended by over 100 African participants from Benin,Burkina Faso, Senegal, Togo and Ivory Coast. Also in attendance at this seminar were 10 members of TC D4, Deputy Secretary General of PIARC, two European experts and a delegation from Haiti.

The theme of this seminar was: "1st International Seminar on Geotechnics and Unpaved Roads." Three themes were discussed:

- Theme 1: Challenges and recent developments in engineering design and construction of unpaved roads
- Theme 2: The maintenance of geotechnical and unpaved roads
- Theme 3: Innovations and Research

Twenty papers were presented and are available on the PIARC website at the following address:

http://publications.piarc.org/fr/seminaires/seminaires09/cotonou-octobre09.htm .

The list of submissions is presented in the following table.

Table 2. List of submissions made under the Cotonou seminar (October 2009)

Title	Author	Country
Topic 1: Issues and Recent Developments of engineering design and construction of unpaved roads		
Unpaved roads in Benin: design and construction	**Michel ATADJO,** *MDCTTTATP-PR/DGTP*	***Benin***
The geotechnical characteristics of pavement materials: quarry research by CNERTP	**Valerie D. MONTCHO** , *Directeur de la Recherche au CNERTP*	***Benin***
Soil classification.	**Jean-Pierre MAGNAN,** *LCPC*	***France***
Theme 2: Maintenance of geotechnical and unpaved roads		
Embankments on soft soils: Tovêgbamè Dyke.	**David T OLODO** , *MDCTTTATP-PR/SGM*	***Benin***
Stabilization of landslides by hydrogeological actions.	**Aurèle PARRIAUX,** *Professor EPFL*	***Switzerland***
Programming, implementation and monitoring of road maintenance.	**Lucien HOUSSE,** *PR Coordinator at MDCTTTATP-*	***Benin***
Annual funding of road maintenance works: eligibility criteria and mechanism for payment.	**Sylvestre KOTCHOFFA,** *D/Fonds routier*	***Benin***
Low cost earth and gravel road maintenance.	**Alex KIDD,** *Highways Agency*	***United Kingdom***
Theme 3: Innovations and Research		
Substitute materials for lateritic gravels in pavements.	**David T OLODO,** *MDCTTTATP-PR/SGM*	***Benin***
Reinforcement of soft soil with stone columns: a site on the lagoon shore of Porto Novo.	**Séverin EBLOHOUE,** *CNERTP*	***Benin***
Surface coatings reinforced by geotextile (ESRG) for protection of earth roads.	**Jean-Claude AURIOL,** *LCPC*	***France***
Benin experience of Labour based road maintenance of unpaved roads.	**Ade TUTU,** *Consultant DANIDA*	***Benin***
Using tar sands of Mavuma (DRC) for repairing potholes.	**Yves HANOTEAU,** *CTB,* presented by **Bernard DETHY,** *RRC*	***Belgium***
General Conclusions	**Martin SAMSON** *President CTD.4*	***Canada***

The summary report and the main conclusions of this seminar will be presented during the technical session of the D4 Committee.

2.3 Topic 4.3: Climate Change Adaptation

For this theme which was discussed at the previous session, the D4 Committee wished to elaborate on the anticipated effects of climate change by region and their probable consequences. It was considered that a better understanding of phenomena and their impacts will enable us to be better prepared and to better adapt the works to these changing conditions.

The report prepared on this topic includes two parts:

Part I: Illustration of the main climatic effects expected with regard to the geomorphological conditions of the Earth.

It is possible with maps of the world to show how climate stress is distributed spatially at a grand scale, so that different regions of the globe can see the major effects which will concern them. Maps of terrain, especially the coastal plains and slopes, are linked to the climate maps. On these maps are represented those sites that are described in detail in Part II.

Part II: Types of situations demonstrated on the basis of case studies at a more detailed scale.

The action of the phenomena is described for the sites and abundantly illustrated. For each case, mention is made of the positive and negative effects on the geotechnical structures. It also shows what options are available to neutralize the negative effects, in part taken from the previous report of TC4.5. General reminders are given about the uncertainties of prognosis.

A summary report on this topic will be published shortly.

3. REFERENCES

- *Promote the optimal use of local materials, Ref. PIARC: 2007R09;*
- *Anticipating the effects of climate change on road earthworks, Ref. PIARC: 2008R12.*