WORLD ROAD ASSOCIATION

STRATEGIC PLAN 2012 – 2015

Terms of Reference for the Strategic Themes and Technical Committees

Starting from the structure of the Strategic Themes and Technical Committees adopted by the Council at its meeting in Budapest, the first draft was developed following consultation with the Technical Committees and Strategic Theme Coordinators. This initial draft was the subject of consultations with Council members; it was discussed at the Strategic Planning Commission meeting in Paris in February 2011 and subsequently revised.

Further discussions were held at both the Strategic Planning Commission and Executive Committee meetings in Perth (Australia) in April 2011. This revised document used for the call for nomination of Strategic Theme Coordinators, Chairpersons and Secretaries of the Technical Committees of the coming 2012-2015 work cycle reflects those discussions.

The final version of the terms of reference will be produced after the Council meeting in Mexico City this September.

May 2011

4.3 GOALS, ISSUES, STRATEGIES AND OUTCOMES FOR STRATEGIC THEMES AND TECHNICAL COMMITTEES

These terms of reference for the Strategic Themes and Technical Committees provide the framework within which a programme of work will be developed by each Technical Committee. In developing these programmes Technical Committees, and in particular the Technical Committee Chairs and Strategic Theme Coordinators, should bear in mind the need to build upon the work undertaken by Technical Committees in the previous and earlier cycles and to ensure that the outputs of the Technical Committees have a genuine and lasting value.

To this end there is a significant move towards the development of a more structured approach to delivering information in each subject area. This is intended to assist Technical Committees and Strategic Theme Coordinators in developing interlinked products that will be of very high value to members and the broader road and transport community. These will develop over a number of cycles and will, in time, become definitive internationally-recognised sources of advice, guidance and best practice information. In time these may develop and be developed into more formal Manuals and Handbooks of which the current ITS Handbook, Road Tunnels Manual and Road Safety Manual provide excellent examples.

Each Technical Committee shall develop a subject overview that effectively describes the full width and breadth of the relevant knowledge area(s), identifying where the contributions detailed in the Committee's terms of reference lie. This activity should be undertaken during the first meeting(s) of the Technical Committees and form the first output before the end of the first year of the cycle. This activity should be undertaken in close collaboration with the relevant Strategic Theme Coordinator. Each Technical Committee should then organise existing knowledge, in particular that produced by the Association, within that structure and develop web-pages introducing and commenting upon existing reports in order to populate the knowledge-base.

In developing the Technical Committees' programmes full account must be taken of the need to ensure that outputs are not simply delivered at the end of the four-year cycle but that articles for *Routes/Roads*, seminars, reports, and chapters of handbooks or manuals are produced at interim stages within the cycle as well. All Technical Committees are expected to produce articles during the four-year cycle for *Routes/Roads*.

4.3.1 Strategic Theme 1: Management and Performance

Goal

Encourage the development of road transport policies and strategies that result in road administrations that perform well and that are funded sustainably. Provide exemplars of good governance and road administrations that fund their activities in an appropriate manner, that incorporate best practice in respect of climate change mitigation, and adaptation and the management of associated and other forms of risk.

Overview

Strategic Theme 1 brings together matters related to the policies and strategies that road administrations develop and enact.

The integration of road administrations and other transport modes within single administrations presents both challenges and opportunities. Performance assessment reflects such new structures and increased stakeholder power and media scrutiny mean that good governance and effective anti-corruption measures remain of paramount importance. **Technical Committee 1.1** will develop guidance on these issues based on the experiences of member countries.

The sustainability of funding is a major issue for many member countries and the introduction of private sector tolls and of road user charging remains a delicate political issue in many countries. Indeed, contractual aspects of private sector funding and the associated costs of such funding are changing in the light of the global financial crisis. These issues are studied in **Technical Committee 1.2**.

Technical Committee 1.3 deals with transport strategies for climate change mitigation and adaptation in the context of national policies for such actions as well as assessing the available tools for understanding carbon outputs and for the sustainability appraisal for transport infrastructure plans.

Investment in roads can create substantial social and economic benefits and improvements to quality of life. Incorporating these benefits into the appraisal process is of great assistance to decision-makers in setting priorities for limited available resources. **Technical Committee 1.4** will investigate new developments in this arena alongside methods of long-term post-project monitoring that fully capture the benefits of schemes and plans.

Risk assessment and management is fundamental to the operation of a transport network. **Technical Committee 1.5** will focus on the role of risk assessment and management in policy development and decision making, road operation and emergency response. The Technical Committee will consider also combined and large magnitude hazards, the consequences of which might reasonably be described as disastrous or catastrophic.

Technical Committees:

1.1 Performance of Transport Administrations
1.2 Financing
1.3 Climate Change and Sustainability
1.4 Road Transport System Economics and Social Development
1.5 Risk Management

TC 1.1 – Performance of Transport Administrations

Issue 1.1.1 Evolution of structures and missions of the administrations	
Strategies	***Outputs***
Investigate the recent changes in road administrations (integration of transport modes, scope of responsibilities, nature and size of road network, increased stakeholder power and involvement, etc.). Analyse and understand the drivers for these changes, the challenges involved in their implementation, the expectations of those driving the change and identify the impacts.	Lessons learned and guidance report on changes within transport administrations.
Issue 1.1.2 Assessment of performance of the administration	
Strategies	***Outputs***
Investigate how the performance of road or transport administrations is being assessed and encouraged in planning schemes, identify the benchmarks and added values.	Guidance report identifying benchmarks for transport administration performance.
Issue 1.1.3 Good governance and anti-corruption measures	
Strategies	***Outputs***
Understand and investigate current situations of and key issues affecting institutional integrity with a focus on anti-corruption measures in the road sector and identify the effective benchmarks of integrity laws, policies and measures, transferable lessons including implications of increased scrutiny by the media.	Guidance report on the key issues impacting upon institutional integrity including relevant case studies.

TC 1.2 – Financing

Issue 1.2.1 Funding strategies for a sustainable road system	
Strategies	***Outputs***
Investigate the new developments in funding strategies taking in particular into consideration national policies aiming at reducing energy consumption and favouring electrical motoring. Catalogue these new developments. Analyse their objectives, implementation processes and challenges (including acceptability by payers), collection costs, evolution of revenues raised, proportion of collected revenues going to the road sector, and sustainability. Examine whether the new funding streams are additional or substitution to prior funding strategies for the road sector.	State of practice including lessons learned.
Issue 1.2.2 Private sector financing	
Strategies	***Outputs***
Investigate how key contractual aspects (i.e. risk allocation and transfer, risk mitigation and management, contract flexibility during concession period, rules of anticipated ending of concession, traffic and revenue risks, financing risk, etc) have changed through time (differentiating pre- and post-global financial crisis) and their impact on project structure in order to reach financial closure and value for money.	Report and case studies, where appropriate, adopted by countries at different development stages, illustrating their evolutions and achievements.
Establish the costs of private financing, i.e. expected equity rate of return and debt interest rate, by payment mechanism and by geography and how these have changed through time (differentiating between pre- and post-global financial crisis).	Report on costs of private financing in comparison with public financing.
Benchmark capital costs of similar infrastructure services (e.g. railways, and power and water utilities) and identify reasons for variances between these different sectors and the road sector.	Review of benchmark results in comparison with different infrastructure services.

TC 1.3 – Climate Change and Sustainability

Issue 1.3.1 Transport strategies regarding climate change mitigation and adaptation	
Strategies	***Outputs***
Identify and compare the boundary conditions within which National Transport authorities in different countries have strategies to address climate change mitigation and adaptation: e.g. influence over levels of demand, interaction /collaboration with other modes, low- / zero-carbon technologies, etc, and how they are working within these boundaries. Analyse the different national transport targets, in the context of national targets, and the proposed routes to achieving them.	State-of-the-art report with recommendations on the development of successful strategies.
Issue 1.3.2 Tools for understanding climate change mitigation	
Strategies	***Outputs***
Investigate the approaches and tools used for understanding climate change mitigation (Carbon accounting and auditing, carbon foot-printing including life-cycle analysis, etc.) In the analysis, compare the methodologies, examine the uncertainty of the results, identify the challenges regarding implementation, benchmark the presentation and use of the results.	State-of–the-art report and recommendations.
Issue 1.3.3 Appraisal of sustainability of transport infrastructure plans	
Strategies	***Outputs***
Investigate how sustainability of transport infrastructure plans is being appraised and used in decision-making processes. Report on the extent to which sustainability is being considered for countries at different stages of economic development.	State-of-the-art report and recommendations.

TC 1.4 – Road Transport System Economics and Social Development

Issue 1.4.1 Appraisal of economic and social decision-making methodologies for transport infrastructure projects	
Strategies	***Outputs***
Investigate new developments in appraisal of economic and social aspects in decision-making methodologies for transport projects. Identify where and how they have been applied and if this has induced changes to standard practices.	State-of-the-art report on the methodologies, complemented by case studies.
Issue 1.4.2 Post-project monitoring / long term evaluation of transport infrastructure projects	
Strategies	***Outputs***
Investigate how post-project monitoring and long term evaluation are carried out for transport infrastructure projects. Benchmark the institutional contexts, the methodologies and how the results are actually being used.	State-of-the-art report complemented by case studies and recommendations.

TC 1.5 – Risk Management
Dealing with natural and manmade hazards

Issue 1.5.1 Role of risk assessment in policy development and decision making	
Strategies	***Outputs***
Analyze how risk assessment is being used and incorporated in policy development and decision making within the transport administrations and agencies. Up-date the work of TC C3 on public perception of risk regarding the road transport system, including recent events.	State-of-the-art report and recommendations for road authorities. Up-dated report on public perception and acceptance of risk.
Issue 1.5.2 Methodologies and tools for risk assessment and management applied to road operations	
Strategies	***Outputs***
Identify and evaluate methodologies and tools for the management of natural and man-made risks in road operations and subsequent decision making. Identify strategies applied to manage the risks associated with natural and man-made hazards including the adaptation of road infrastructure to climate change. Integration in a web-based manual of the outputs of the current and past cycles.	Further development of a tool box as part of the Association's web-based knowledge base for dissemination of basic risk management techniques in the road community. Case studies on techniques for managing the risks associated with natural and man-made hazards including the adaptation of road infrastructure to climate change. Web-based electronic version of a Risk Management Manual.
Issue 1.5.3 Management of emergency situations	
Strategies	***Outputs***
From selected case studies analyze how emergency situations affecting the road transport system are managed. Investigation will consider in particular the issues of coordination between the different authorities, the coordination between the different modes of transport, the information to users, the response of the public.	Recommendations based on a presentation of case studies.
Issue 1.5.4 Combined / large scale hazards	
Strategies	***Outputs***
Analyse how risk / emergency management is undertaken from case studies of combined / large scale hazards (e.g. earthquake/ tsunami, earthquake / landslide).	Report on case studies

4.3.2 Strategic Theme 2: Access and Mobility

Goal

Encourage the improvement of access and mobility provided to the community and industry by improved road network operation and integration with other transport modes.

Overview

Strategic Theme 2 recognises that road authorities provide a service to the community and industry, thus recognising these groups as customers. At the heart of this issue is the need to provide services in a predictable manner and to ensure that the resilience of the network is set at an appropriate level.

Obtaining maximum benefit from existing network infrastructure is a priority for many member countries. Improvements to journey time reliability are particularly important whether achieved by interfacing with other modes and/or the use of ITS. **Technical Committee 2.1** will examine these issues and update key Handbooks as well as pursuing work on cooperative vehicle highway systems.

Technical Committee 2.2 will build on the work of the previous cycle comparing strategies of urban mobility, identifying transport infrastructure design for multimodality and investigation measures to promote non-motorised mobility.

The importance of effective and efficient freight transport to the economy is patent. **Technical Committee 2.3** will examine issues surrounding interurban and urban freight management and investigate freight co-modality. Co-modality is defined as the use of different modes on their own and in combination with the aim of obtaining an optimal and sustainable utilisation of resources.

Road networks are particularly vulnerable to the adverse effects of winter weather and maintaining acceptable levels of service in the light of budget cuts during sustained snow events can be particularly challenging. Issues such as sustainability and climate change must also be considered and the provision of appropriate data to road users is vital. **Technical Committee 2.4** will study these issues in addition to actively preparing the technical programme for the 2014 Winter Road Congress.

Accessibility of road infrastructure for rural communities remains an important topic for poverty alleviation, via access to social, educational and employment opportunities. **Technical Committee 2.5** will focus on the effect of national policies on such provision and new strategies for the sustainable management and maintenance of rural roads.

Technical Committees:

2.1 Road Network Operations
2.2 Improved Mobility in Urban Areas
2.3 Freight Transport
2.4 Winter Service
2.5 Rural Road Systems and Accessibility to Rural Areas

TC 2.1 – Road Network Operations

Issue 2.1.1 Road network management for improved mobility	
Strategies	***Outputs***
Investigate successful approaches and identify the factors taking into consideration improved capacity, more reliable journey times, energy saving, safety and minimizing greenhouse gas emissions. Particular attention should be given to solutions considering interfaces with other modes and organisational/governance issues.	Best practice report. Upgraded web-version of the Network Operation Handbook.
Issue 2.1.2 Use of ITS including consideration of planning for future improvements and upgrades; consideration of economy	
Strategies	***Outputs***
Study more efficient and effective use of ITS from the perspective of the cost and benefit analysis considering initial investment in early stage, operating costs and future maintenance cost (full life cycle analysis). Investigate applications of ITS technologies in developing countries and identify those that are the most promising and relevant for these countries. Update and upgrade the Association's ITS Handbook.	Guidance report. State of practice report and recommendations. Upgraded web-version of the ITS Handbook.
Issue 2.1.3 Cooperative vehicle highway systems	
Strategies	***Outputs***
Investigate innovative approaches of better use of ITS for the purpose of improved network operation, with particular focus on vehicle-based technology and vehicle-infrastructure/vehicle-vehicle communications in cooperation with FISITA.	State-of-the-art report.

TC 2.2 – Improved Mobility in Urban Areas

Issue 2.2.1 Comparison of strategies for sustainable urban mobility	
Strategies	***Outputs***
Investigate how the concept of sustainable urban mobility is being translated into strategies and plans for actions in large cities. Benchmark the approaches used for decision making, the methods and tools for assessing the results.	Report presenting case studies and recommendations drawn from good practices.
Issue 2.2.2 Design of transport infrastructure for multimodality in urban areas	
Strategies	***Outputs***
Identify good practice for the design of urban roads in central and peripheral areas of large cities including effective provision for public transport networks, parking policies, urban environmental management of infrastructure works, etc.	Report presenting case studies and recommendations drawn from good practices.
Issue 2.2.3 Promotion of walking and cycling	
Strategies	***Outputs***
Investigate effective and innovative measures taken to promote walking and cycling including the design of sustainable neighbourhoods, measures to secure safety for vulnerable users, involvement of NGOs in decision-making, public awareness and empowerment.	Report presenting case studies and recommendations drawn from good practices.

TC 2.3 – Freight Transport

Issue 2.3.1 Freight management	
Strategies	***Outputs***
Study interurban and urban freight management, considering the influence of logistics strategies on: delivery models and road freight transport, overnight transport, dangerous goods transport, road access and guidance control, terminals and transfer stations, truck parking and security. Investigate truck management strategies and measures to improve the economic and environmental efficiency of road freight (including noise reduction).	Report based on case studies.
Issue 2.3.2 Co-modality for freight transport	
Strategies	***Outputs***
Investigate how the concept of co-modality is implemented with the objective of an optimal use of the different modes of transport for freight. Identify the initiatives, objectives, results and obstacles. Analyse, in particular, the outcomes regarding modal shift of freight transport from roads to other modes.	Report on case studies and recommendations.

TC 2.4 – Winter Service

Issue 2.4.1 Crisis management of unusually severe and/or sustained snow events	
Strategies	***Outputs***
From actual case studies of unusually severe and/or sustained snow events which have produced large disturbances to the transport system investigate how the institutional arrangements, operations measures (including supply and distribution of de-icing agents), coordination between transport modes and the provision of information to users can most effectively contribute to minimise disturbances and lead to a rapid return to 'normal' conditions.	Case studies report and recommendations.
Issue 2.4.2 Sustainability and climate change considerations in winter operation	
Strategies	***Outputs***
Study the environmental impacts of winter maintenance taking into consideration increased variability in weather conditions including uncertainty regarding the occurrence and magnitude of harsh winter conditions.	Guidance report.
Issue 2.4.3 Advanced technology for data collection and information to users and operators	
Strategies	***Outputs***
Investigate innovative approaches for data collection and information to users and operators for the purpose of safer winter operation, with particular focus on vehicle-based technology.	Case studies.
Issue 2.4.4 Preparation of the 2014 Winter Road Congress in Andorra	
Strategies	***Outputs***
Identify the priority themes for the congress while taking into consideration the concerns and possible contributions from other Technical Committees (e.g. bridges, pavements, etc.) and prepare the scientific program. Up-date the Snow and Ice Data book	Definition of the technical programme incorporating session(s) on the various criteria of winter operation for decision makers and acceptable levels of service. Production of the proceedings. Up-dated electronic version of the Snow and Ice Data Book

TC 2.5 – Rural Road Systems and Accessibility to Rural Areas

Issue 2.5.1 National policies for sustainable rural roads systems	
Strategies	***Outputs***
Analyse the national policies implemented in different developing countries for the development and conservation of the rural roads systems focussing on institutional aspects, decentralization issues and funding mechanisms.	Report presenting a benchmark of the national policies, achievements and issues.
Issue 2.5.2 Management of maintenance and improvements to rural roads	
Strategies	***Outputs***
Over the past decade a number of initiatives have been launched to promote the development of micro-enterprises and involve local populations in the maintenance of and improvements to rural roads. Based on country case studies review the evolution over time, lessons learned and identify conditions for success for different geographical and socio-economic contexts.	Report on case studies and recommendations.
Issue 2.5.3 Promoting sustainable maintenance of rural road systems	
Strategies	***Outputs***
From case studies highlight the socio-economic and financial consequences of insufficient maintenance of rural roads.	Short report for the attention of politicians and decision makers.

4.3.3 Strategic Theme 3: Safety

Goal

Improve the safety and efficiency of road transport, including the movement of people and goods on the network, while effectively and widely promulgating knowledge of all aspects of road safety and encouraging effective implementation.

Overview

Roads play a fundamental part in the provision of safe access to education, welfare and employment opportunities. The Association's Declaration of Support for the **UN Decade of Action on Road Safety** reflects the importance of continued improvements to road safety. The work of Technical Committees 3.1 and 3.2, and Task Force 1 will contribute in particular to the following three of the five pillars of the UN Decade of Action:

- Building management capacity.
- Influencing road design and network management.
- Influencing road user behaviour.

Technical Committee 3.1 will examine the policies and strategies underpinning safety investment decision making, strategies used to apply systematic road safety improvements to routes and networks, and the integration of road safety into land use and urban planning. This work will be incorporated into the Road Safety Manual.

Technical Committee 3.2 will focus on issues pertinent to vulnerable road users, driver distraction and fatigue, and the role of human factors in accident investigation. The work will be incorporated into the Road Safety Manual and also lead to revised Accident Investigation Guidelines.

The successful past work of the Association in the area of road tunnel operations will be built upon by **Technical Committee 3.3**. It will study how sustainable road tunnel operations may be ensured, develop an improved understanding of safety management in the light of accidents and fires and begin study of underground road networks. Much of the work will be incorporated into an updated Road Tunnels Manual.

Task Force TF1 will, with the assistance and close collaboration of the General Secretariat, be responsible for the delivery of a major revision and update to the Association's Road Safety Manual.

Task Force TF2 will forge links with relevant sectors to assemble knowledge pertaining to transportation security, and to bring that knowledge to the attention of the Association's membership.

Technical Committees:

3.1 National Road Safety Policies and Programs
3.2 Design and Operations of Safer Road Infrastructure
3.3 Road Tunnels Operations

Task Forces

TF1 Road Safety Manual Task Force
TF2 Security Task Force

TC 3.1 – National Road Safety Policies and Programmes

Issue 3.1.1 Road safety investments and planning	
Strategies	***Outputs***
Building on the efforts of TCs C.1 and C.2, identify and document approaches and strategies for making broad safety investment programme decision. Decision-making tools that include financial models, cost-benefit analysis approaches, and other investment tools are part of the scope.	Case studies of successful strategies and practices. Chapter content for the Road Safety Manual.
Issue 3.1.2 Methodological safety approach	
Strategies	***Outputs***
Identify and document strategies for taking a systematic, holistic approach to address safety features in need of improvement on road routes and networks.	Case studies of successful strategies and practices. Chapter content for the Road Safety Manual.
Issue 3.1.3 Land use and urban planning	
Strategies	***Outputs***
Develop strategies (including legal and political ones) for the integration of road safety in land use and urban planning especially in the context of linear settlements and new developments.	Recommendations for the integration of road safety in land use planning and urban development. Chapter content for the Road Safety Manual.

TC 3.2 –Design and Operations of Safer Road Infrastructure

Issue 3.2.1 Vulnerable road users	
Strategies	***Outputs***
Building from the efforts of TCs C.1 and C.2 and the Technical Sheets of the Road Safety Manual: - Create guidelines for safer urban and interurban roads with the focus being on the needs of vulnerable road users including pedestrians, young people, cyclists, motorcyclists and others. - Revise the road safety audit and inspection guidelines and checklists for urban and interurban roads to incorporate safety knowledge for vulnerable road users.	Create new or updated guidelines and checklists. Create new chapter(s) for the Road Safety Manual on accounting for the safety of vulnerable road users.
Issue 3.2.2 Revision of the Association's Accident Investigation Guidelines	
Strategies	***Outputs***
Review the Association's existing Accident Investigation Guidelines for engineers and the Human Factors Guidelines to identify knowledge gaps and opportunities to upgrade and update the content.	Revised Accident Investigation Guidelines which take into consideration human factors information and all accident severity levels. Update chapters four to six of the Road Safety Manual.
Issue 3.2.3 Driver distraction and fatigue	
Strategies	***Outputs***
Identify and document successful strategies for addressing driver distraction and fatigue with the focus on engineering solutions (including road design solutions).	Case studies of successful strategies and practices. Chapter content for the Road Safety Manual.

TC 3.3 – Road Tunnels Operations

Issue 3.3.1 Sustainable road tunnel operations	
Strategies	***Outputs***
Identify methods for ensuring sustainable road tunnel operations through the review of current practices.	Recommendations and case studies on sustainable road tunnel operations including cost, environmental and other issues to consider during the design, installation and maintenance of road tunnels. Best practice for life cycle analysis, both for new and existing tunnels.
Issue 3.3.2 Integrated road tunnel safety	
Strategies	***Outputs***
Draw lessons from current practice regarding safety management and the analysis of road tunnel accidents and fires worldwide	Best practice for fixed fire fighting systems (FFFS) in road tunnels. Best practice on measures to support persons with reduced mobility. Feedback from experience on tunnel safety (including statistics and analyses on real accidents) as a basis for risk management. Recommendations on real-time communications with users.
Issue 3.3.3 Underground road networks	
Strategies	***Outputs***
Identify and analyse existing and planned complexes of urban underground road networks with interchanges and multimodal concerns from the point of view of operations and safety.	Report on case studies and recommendations.
Issue 3.3.4 Knowledge sharing on tunnel operations and safety	
Strategies	***Outputs***
Upgrade the web-based version of the Road Tunnels Manual. Develop a training course on road tunnel operations and safety for emerging countries.	Further developments towards a fully-integrated online Road Tunnels Manual. Training courses and training material on road tunnel operations and safety, in cooperation with the International Tunnelling and Underground Space Association (ITA / AITES).

TF1 – Road Safety Manual Task Force

Issue TF1.1 Lead the development and maintenance of the Road Safety Manual structure	
Strategies	***Outputs***
Examine the proposed outline generated by the Chairs of Technical Committee C.1 and C.2, of the last cycle, and confirm the structure for the revised Road Safety Manual. For all Technical Committee products intended for inclusion in the Road Safety Manual, confirm the appropriate placement within the established structure.	Final structure of the updated Road Safety Manual.
Issue TF1.2 Oversee the work of the Road Safety Manual contractor	
Strategies	***Outputs***
Manage tasks generated by the Technical Committees for the contractor. Review and approve draft products from the contractor based on task orders.	Updated components of the Road Safety Manual.
Issue TF1.3 Final approval of the Road Safety Manual	
Strategies	***Outputs***
Review and approve of complete Road Safety Manual containing the results of tasks performed by the contractor and inputs from the Technical Committees.	Complete Road Safety Manual.

TF2 – Security Task Force

Issue TF2.1 Defining the scope of the effort	
Strategies	***Outputs***
Establish outreach process to secure expertise from sectors not traditionally part of the Association's membership. Articulate the scope of investigations pertaining to infrastructure-related aspects of transportation security.	Task Force configuration that will determine the scope of knowledge review and dissemination that can be undertaken.
Issue TF2.2 Review of current knowledge	
Strategies	***Outputs***
Identify key issues of interest to developed and developing countries related to road transportation security (based on the scope agreed upon through the first strategy).	Outline of topics related to infrastructure hardening, including bibliographical references. Proposal on how to make this information resource available to the Association's members.
Issue TF2.3 Dissemination of knowledge	
Strategies	***Outputs***
Information gathering to determine topics of critical interest to the membership. In consultation with the General Secretariat, organise one or two workshops based on selected topics found to be of greatest interest to the Association's membership.	Conduct a survey or similar instrument to gauge interest in specific aspects of security (derived from the topics contained in the outline of topics mentioned above). Workshops or seminars organised during works cycle to focus on specific issues identified.

4.3.4 Strategic Theme 4: Infrastructure

Goal

Improve the quality and efficiency of road infrastructure through the effective management of assets in accordance with user expectations and government requirements while adapting to climate change and changing energy scenarios and policies

Overview

While new technological, social and environmental developments are expanding the sphere of interest for road authorities, management of road infrastructure remains their core business. The need for more efficient and effective use of budgets requires constant balancing of funds to road assets in terms of construction and maintenance.

Assessing the budget level needed to provide optimal maintenance for road infrastructure and balancing the needs of multiple assets with budgetary constraints is an important part of the work of road administrations. This is reflected in the work of **Technical Committee 4.1** which will also examine the important issue of balancing these important engineering needs with environmental constraints.

Technical Committee 4.2 will study rapidly developing technology surrounding road condition monitoring and the service life of road pavement wearing courses, in particular means of obtaining a longer service life. Means and materials to reduce the carbon footprint of pavement materials will also be studied.

The adaptation to climate change of road bridge construction, maintenance and operation will be studied by **Technical Committee 4.3** alongside repair and rehabilitation materials, risk-based management of the bridge stock and the estimation of load carrying capacity.

In the area of earthworks and unpaved roads, **Technical Committee 4.4** places a strong emphasis on the optimal use of local materials in support of the 'proximity principle' and maintenance techniques for unpaved roads in developing countries as well as the very important topic of slope and foundation drainage, and storm water management.

The impacts on construction, management and operation of these different asset classes due to climate change – such as increased rainfall, increased temperatures, more frequent extreme weather events and greater climate instability – are reflected in the terms of reference of these Technical Committees. Communication and coordination of effort with Technical Committee 1.3 is essential in order to ensure that duplication of effort is minimised and that outputs are complementary.

Technical Committees:

4.1 Management of Road Assets
4.2 Road Pavements
4.3 Road Bridges
4.4 Earthworks and Unpaved Roads

TC 4.1 – Management of Road Assets

Issue 4.1.1 Assessment of budgetary needs for maintenance of road infrastructure	
Strategies	***Outputs***
Review the approaches and practices taken by countries for assessment of budgetary needs for maintenance of road infrastructure. Define a common framework allowing comparison, between different countries, of the cost of maintenance of road pavements for given categories of comparable roads.	Development of case studies. Illustrate through case studies the best practice for road infrastructure authorities.
Issue 4.1.2 Optimisation of maintenance strategies for multiple assets of road networks	
Strategies	***Outputs***
Investigate what are the approaches implemented for determining maintenance strategies aiming at making the best use of allocated budgets. In particular investigate: - if and how the strategy is related to the search for an optimum level of expenditure; - approaches used for determining the allocation of maintenance resources under budgetary constraints between the categories of assets (pavements, bridges, tunnels, geotechnical structures, roadside equipment).	Report presenting the methodologies, conditions for implementation of these approaches, lessons learned from the application of these approaches.
Issue 4.1.3 Balancing of environmental and engineering aspects in management of road networks	
Strategies	***Outputs***
From case studies investigate how environmental aspects are taken into consideration in complement of engineering aspects in the management strategies applied to road networks.	Report on case studies and recommendations.
Issue 4.1.4 Road Assets Management Manual	
Strategies	***Outputs***
Building on the work of the previous cycles, design and start the development of a Road Assets Management Manual which will integrate the outputs of the current cycle.	Web-based electronic Road Asset Management Manual

TC 4.2 – Road Pavements

Issue 4.2.1 Road condition monitoring and road/vehicle interaction	
Strategies	***Outputs***
Review the progress in road condition monitoring and road/vehicle interaction technologies, including Intelligent Transport Systems. Identify and review the different approaches taken by institutions and industries in assessing and determining the service life of wearing courses.	Symposium SURF2012 and state of the art report on road condition monitoring and road/vehicle interaction. State of practice report and recommendations.
Issue 4.2.2 Recycling and reuse of materials for pavements	
Strategies	***Outputs***
Building on the guidelines produced by past TCs on in-place and in-plant recycling, up-date, upgrade and complement (in the area of concrete pavements in particular) the guidelines taking into consideration the knowledge and experience gained during the recent years and the progress in technology. Attention should be paid to recommendations for countries where recycling is not yet widespread.	Electronic version of the up-graded guide lines.
Issue 4.2.3 Reducing the life cycle carbon footprint of pavements	
Strategies	***Outputs***
Review field feedback on recent innovations (products, equipment) which contribute to reduce the carbon footprint in pavements. This will include in particular warm asphalt concrete technologies. Critical review of the assessment of reductions in the carbon footprint as compared to standard methods of construction including the use of reused, recycled and recovered materials.	Report on assessment of recent innovations. Report on the assessment of performance of carbon footprint reduction.

TC 4.3 – Road Bridges

Issue 4.3.1 Adaptation to climate change	
Strategies	***Outputs***
Identify the technical aspects of road bridges subject to adaptation to climate change taking into consideration the assessment produced by *Working Group II: Impacts, Adaption and Vulnerability* of the Intergovernmental Panel on Climate Change, IPCC.	A review outlining potential impacts on road bridge construction, maintenance and operations.
Issue 4.3.2 New repair and rehabilitation materials	
Strategies	***Outputs***
Undertake a review of the new repair and rehabilitation materials developed and/or installed and/or studied by consideration of their cost-effectiveness. Review the methodologies for assessing the new repair and rehabilitation materials. Identify the approaches taken by road authorities regarding implementation of new repair and rehabilitation materials.	Case studies with a summary of the cost-benefit analysis of the new repair and rehabilitation materials. Analysis of and report on the assessment methodologies. Report and recommendations.
Issue 4.3.3 Risk-based management of the bridge stock	
Strategies	***Outputs***
Review how risk assessment is used in the management of the bridge stock (type of risks considered, risk analysis, relation to decision-making, etc). Investigate the existing tools and make a critical review.	State-of-the-art report including case studies. Report on existing tools.
Issue 4.3.4 Estimation of load carrying capacity of bridges based on damage and deficiency	
Strategies	***Outputs***
Analyze existing estimation methods of load carrying capacity of bridges based on damage and deficiency. Identify best practice approach for the use of data in supporting the estimation of load carrying capacity for reducing damage and deficiency.	Report presenting a critical review of exiting estimation methods of load carrying capacity. Produce case studies of data collection and use for the estimation of load capacity.

TC 4.4 – Earthworks and Unpaved Roads

Issue 4.4.1 Optimal use of local materials	
Strategies	***Outputs***
Building on the work of past cycles update and complement the recommendations regarding the optimal use of local materials, including: - lateritic, and other soils that are highly susceptible to environmental weathering; - construction under extreme weather conditions.	Report upgrading and complementing the previous reports on the use of local materials.
Investigate construction methods and alternative materials with the potential to reduce the environmental impacts of earthworks, in particular: - the reduction of the consumption of water; - the removal of water from 'wet' materials; - the use of 'wet' and 'dry' materials in their in situ state; - the use of reused, recycled and recovered materials, particularly where lightweight construction is indicated; - the reduction of energy and greenhouse gas emissions.	Recommendations on construction methods and materials.
Issue 4.4.2 Slope and foundation drainage and storm water management	
Strategies	***Outputs***
Review the efficient methods and approaches with regard to slope and foundation drainage, and storm water management, including the effects of climate change and the associated need for adaptation.	A report and a seminar to report on and share the methods and approaches of slope and foundation drainage, and storm water management.
Issue 4.4.3 Maintenance techniques for unpaved roads in developing countries	
Strategies	***Outputs***
Review the progress made in maintenance techniques, including localised or 'spot' improvements, for unpaved roads that have been introduced by developing countries.	Guidance report on maintenance techniques for unpaved roads in developing countries.

Committee on Terminology

Issue T.1 Updating the World Road Association Dictionaries	
Strategies	***Outputs***
Update the existing version of the dictionary in each of the current languages, including ongoing upgrading of the French and English dictionaries. Increase the number of languages of translation of the dictionary in liaison with World Road Association member countries.	Upgrade the terminology section of the World Road Association website