PIARC

THE REGIONAL CONTEXT OF SUSTAINABILITY

Friday 24 October 2003 (1.30 - 5.00 p.m.)

SESSION AGENDA & INTRODUCTORY REPORT

22.44.E

SESSION AGENDA

1. **Opening of the session: Experiences and conclusions of the regional seminar of C14**

Mr. Willy A. LYATUU
(Session Chairperson, PIARC C14 Committee member/TANZANIA)

2. **A middle path for sustainable road development in India**

Mr. Ajit B. PAWAR (Public Works Department, Maharashtra/INDIA)

3. **Greenhouse gas scenarios for South Africa's surface passenger transport sector**

Dr. Jolanda PROZZI (University of Texas at Austin/USA)
Mr. Roland I. MIRRILEES (GreenGrowth Strategic cc/SOUTH AFRICA)

4. **Decision making in the context of sustainable transportation, USA and South Africa**

Dr. Josias ZIETSMAN (Texas Transportation Institute/USA)

5. **Evaluating alternative transport systems in Cali, Colombia**

Mr. Stephen MORIARTY and Mr. Terry WANG (Kellogg Brown & Root/UK)

6. **Roads as ecological corridors**

Dr. Aniceto ZARAGOZA (Spanish Road Association/SPAIN)

7. **Wildlife and traffic: European handbook for identifying conflicts and designing solutions**

Mr. Björn IUELL (Norwegian Public Roads Administration/NORWAY)

8. **Discussion**

9. **Conclusions and Closure**

Mr. Willy A. LYATUU
(Session Chairperson, PIARC C14 Committee member/TANZANIA)

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EXECUTIVE SUMMARY

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs": the definition of sustainable development, taken from the 1987 Brundtland Report, involves a new development model based on greater solidarity, between generations and between regions. It also states the premises on the basis of which the Committee on Sustainable Development and Road Transport proposes to address the sustainable development issue in the transport sector.

A successful integration of social, economic and environmental requirements is a necessity for any policy aiming at improving the sustainability of the way we develop, maintain and use our transport system. The sustainability of transport does not stand on its own; transport serves the functions of society and can be sustainable only through the manner in which it performs that task. In different countries, in different economies, the task is expressed in different ways.

The committee session on the regional context of sustainability presents responses to the committee's call for papers. Sustainable transport policy choices are discussed for a broad spectrum of countries - India, South Africa, USA, Colombia and many European countries. Some basic aspects of assessing the environmental impacts of roads are taken up, among them a European handbook on habitat fragmentation.

The draft conclusions of the session take up transport system management, the role of road transport in development and national and regional action.

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1. SUSTAINABLE TRANSPORT

The European Commission working paper SEC (2001) 502, "Integrating environment and sustainable development into energy and transport policies", quoting also in part the definition by the OECD Environmentally Sustainable Transport project, defines sustainable transport as follows:

"Sustainable transport should contribute to social and economic welfare, without harming human health and the environment. Integrating the social, economic and environmental requirements, a sustainable transport system can be defined as a system that:

- *allows the basic access needs and development of individuals, companies and societies to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between generations;*
- *is affordable, operates efficiently, offers choice of transport mode, and supports a competitive economy and regional development;*
- *limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, uses non-renewable resources at or below the rates of development of renewable substitutes and minimizes the use of land and the generation of noise."*

A successful integration of social, economic and environmental requirements is a necessity for any policy aiming at improving the sustainability of the way we develop, maintain and use our transport system. The sustainability of transport does not stand on its own; transport serves the functions of society and can be sustainable only through the way in which it performs that task. But in different countries, in different economies, such aspects as basic access and affordability, transport mode choice and development support, or emissions and waste limits have very different implications. A United Nations Environment Programme report, "Air pollution from ground transportation", takes up such concerns, raised by the issues of sustainability in countries in different stages of development:

"Local and national authorities around the world are grappling with the environmental and social issues that increased demand for motorized access has created; many are facing the same aggregate problems, although the combination of specific causes is unique to each region as is, consequently, the necessary solution. In the past decade and a half, the United States and the European Union have developed institutions which, in addition to having regulatory functions linked to multi-State powers, have taken on the role of information clearing-houses and disseminators of good practice to States and localities within their jurisdiction. For many developing countries, the international community has carried out this function through various arms of the United Nations system and the multilateral development banks, but it has done so with less coherence, and perhaps less success, than the American and European institutions….

Creative and innovative approaches to transportation and economic development problems appropriate to a particular country will need to be developed in specific contexts, by individuals and groups most familiar with those contexts. The international community can play an important role in information exchange, dissemination of best practice information, and financing of think-tanks concerned with innovative approaches to developing country transport problems and pilot projects."

The PIARC Committee on Sustainable Development and Road Transport (C14) has, in its regional seminars and in preparation for the XXIInd World Road Congress, aimed to develop an overview of innovative and creative approaches, appropriate for the different countries and regions of our globe.

2. EXPERIENCES AND CONCLUSIONS OF THE REGIONAL SEMINARS OF C14

Three international seminars have been organized in accordance with the objectives defined in the PIARC strategic plan: in New Delhi, India, with the Indian Roads Congress, in Buenos Aires, Argentina, with the Dirección Nacional de Vialidad and the CENATTEV foundation and in Bucharest, Romania, with the National Haulers' Union of Romania.

Three major conclusions were identified in New Delhi:

1. The importance of maintenance in sustainability, with the necessity of mitigation of adverse social and environmental effects.
2. The importance of upgrading road infrastructure, with special attention to rural roads.

3. The importance of safety in sustainability: accidents, driving education, training, designing, taking non-motorized transport into account.

Gaps were also identified for low or middle-income countries:

- It is essential to define priorities appropriate for developing countries, because copying developed countries is not a solution.
- The multiplicity of agencies responsible for road development and maintenance leads to a lack of interagency coordination.
- Road infrastructure development requires a global and holistic approach.

In Buenos Aires, some major conclusions were:

- The importance of regional cooperation was underlined. Within Latin America, participants from different countries were well acquainted with each other and the neighbouring countries' concerns.
- It is the importance of PIARC technical Committees members' real involvement in other international organizations which sets the limits of liaison and communication to those other organizations. It would be an advantage for PIARC to make these links, especially with regional organizations, more visible in its work. The Technology Transfer Centres may, of course, be precisely the right answer to this problem.
- There is still much room to improve our practical understanding of how things are managed in different countries. It is an essential component of successful technology transfer to understand both how solutions are influenced by the country of origin and how the usefulness of such solutions is influenced by the country applying them.

The European Environment Agency, in its TERM 2002 report, "Paving the way for EU enlargement" gives an overview of how the economies in transition in Europe cope with rapid development, through its assessment of the countries seeking accession to the European Union.

The TERM analysis indicates that the main challenge for the accession countries is to maintain the advantage they have in certain aspects of transport and environment compared to the European Union, and at the same time meet societal needs for improved standards of living, with a consequent increase of mobility demand. With a rail transport share still well above the European Union average, lower transport energy use and pollutant emissions per capita, and less fragmentation of their land, the accession countries have lower pressures arising from transport than is currently the case in the European Union. The report considers it highly regrettable, if this opportunity were lost, but current trends are worrying. The modal split is evolving towards the same predominance of road transport as within the European Union. Road transport volumes are on the rise, and so are the transport sector's energy consumption and greenhouse gas emissions. The number of road accidents and fatalities is also high - safety improvements are more and more offset by transport growth.

3. CLIMATE CHANGE, A GLOBAL CONCERN

The implementation plan of the 2002 Johannesburg Summit on Sustainable Development again underlined the global importance of climate change:

"38. Change in the Earth's climate and its adverse effects are a common concern of humankind. We remain deeply concerned that all countries, particularly developing countries, including the least developed countries and small island developing States, face increased risks of negative impacts of climate change and recognize that, in this context, the problems of poverty, land degradation, access to water and food and human health remain at the centre of global attention.

The United Nations Framework Convention on Climate Change is the key instrument for addressing climate change, a global concern, and we reaffirm our commitment to achieving its ultimate objective of stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner, in accordance with our common but differentiated responsibilities and respective capabilities."

One result of the series of international agreements of the three last decades of the 20th century was that countries defined their greenhouse gas emission reduction policies with a new degree of seriousness. Global goals were given expression on the regional and national level, to end up as responsibilities and duties for the different sectors of the economy.

In order to assess greenhouse gas policy development and implementation, a survey was made in the year 2000 for PIARC's Sustainable Development and Road Transport Committee. Responses from 13 countries were gathered. The sample of the study was small, but some trends and alternatives could be identified even on this scale.

Even though there was already a kind of tradition of national environmental policy and programme development during the '90s, only very few countries, such as Denmark and the Netherlands, have had experience of implementing a national greenhouse gas policy including specific transport measures. Many countries did intend to implement some policy soon, as part of fulfilling their obligations under the 1997 Kyoto Protocol. An assessment on quantifying CO_2 abatement policies, published by ECMT in 2001, noted that:

"in terms of the actual construction of policy packages, there appears to be a complex iterative process in designing policy packages in each country. This reflects the need to identify options and to secure a consensus as to whether they should be included in the final package...One of the most contentious issues is the political acceptability of economic instruments, especially road pricing, a policy that is often proposed, but not implemented in most countries."

Greenhouse gas emissions for transport have generally been included in an overall national programme. The survey did not meet with new cases of separate programmes for transport. However, the kind of combination where programmes of several ministries were joined into one national programme were more common. The programmes focused on measures to be implemented, defining responsible parties and setting the timetable. The magnitude of expected impacts on greenhouse gas emissions was often presented, but mandatory quantitative targets were generally not set for the sectors. The extent of obligatory measures varied and also depended on the division of powers and responsibilities between the government and other authorities.

The programmes seem to imply that reaching the targets set for 2010 is possible without undue stress on national economies or large-scale changes in lifestyle. This may be a simplistic view, putting too much emphasis on the intentions of the measures as compared to their actual impacts - especially considering failures of past policies. There is also a realisation that the targets agreed in Kyoto will not be sufficient and the process will have to continue towards more fundamental changes and to include a wider group of countries.

The European Union working paper on "Integrating environment and sustainable development into energy and transport" notes that:

"Greenhouse gas emissions reduction should be a main focus of near term policy actions, whilst all objectives set out in the integration strategy fully retain their validity, thereby avoiding the risk of sub-optimization. This derives from the fact that transport by far has the highest emission growth rate of all economic sectors and still shows no sign of curbing. Transport also nearly exclusively depends on fossil fuels, the main source of the anthropogenic greenhouse gas emissions on one side, and of limited time range of availability, on the other hand. Priority should be given to policies and measures which simultaneously address the greenhouse effect and other negative effects on environment, notably noise, emissions of particulates and ozone formation – as well as congestion."

4. POLICY PRIORITIES: AN INDIAN VIEW AND THE SOUTH AFRICAN PERSPECTIVE

The developing countries are not parties to the Kyoto protocol, but they are strongly affected by its implementation. It is hardly possible to make a general statement about these countries' approach to greenhouse gas emissions, but the kind of concerns expressed by the Centre for Science and Environment, in India, are shared by many commentators:

"Even though the strategy outlined in the Kyoto Protocol does not insist on participation by developing countries, except through the Clean Development Mechanism and Emissions Trading, it sets the world on a path that does not recognize the atmospheric rights of the current and future generations of developing countries even as it provides the current generations of industrialized countries greenhouse gas entitlements — not based on equity but on the basis of 'current emissions' — and, furthermore, provides developing countries perverse incentives to pollute further. "

The CSE policy statement notes that the purpose of the Kyoto protocol is to set a strategy that would ultimately help all countries to combat climate change in a way that would benefit both current and future generations and on the basis of equity. Therefore, the strategy should be one which helps the countries to combat climate change taking their common but differentiated responsibilities into account. The developing countries should be seen as parties to the protocol, which would also imply a need to review the distribution of emission targets.

On the other hand, transport greenhouse gas emissions are not necessarily a major policy priority of developing countries, rather it is the very high pollutant emission of vehicles in use. For greenhouse gases, more significant emission reductions are as yet to be gained through energy production and industry renewal.

In South Africa, the performance and structure of the transportation system is largely explained by the legacy of apartheid and by privatisation. Apartheid had far-reaching impacts, extending deep into the country's transportation and energy system. Largely as a result of these policies, the country's contributions to global greenhouse gas emissions are high, compared to those of other African nations. At the same time, both passenger and freight transport systems are being privatised, largely because of shrinking government funds and an inability to manage urban sprawl.

The effects of privatisation have been positive in many ways: service has expanded and freight costs gone down. But dwindling subsidies and rapid growth in jitney minibus services have led to sharp ridership losses in the extensive rail and bus systems, resulting in increased energy use and greenhouse gas emissions, pollution, road deaths and continuing urban sprawl.

Numerous policy options exist to reduce emissions, but environmental quality is not a high priority. However, leaders are motivated to improve mobility, accessibility and road safety, and reduce congestion. Many of the strategies targeted at those goals will restrain emissions - even when reduction is not a goal, it is possible to restrain transport emissions without harming economic growth.

5. A MIDDLE PATH FOR SUSTAINABLE ROAD DEVELOPMENT IN INDIA

Road development entails activities such as planning, construction, management and maintenance of a road network. The technology of road construction, maintenance and operations in advanced countries, with its emphasis on automation, is copied in the developing world, rather unmindful of whether it is appropriate or not. This is inevitable in some sense, the world having come far closer today than ever before and coalesced into the metaphorical global village. However, for a developing country such as India, the technology of road construction and maintenance, as employed in the developed countries, needs to be modulated to the peculiar problems of scarcity of capital and abundance of labour and a predominantly rural setting.

At one end of the spectrum of road development is the construction of high traffic density corridors in the form of multi lane national highways and expressways connecting the metropolitan areas. This is perhaps more amenable for the adoption of the technology that embodies mechanization, automation and high-end specifications. However, the categories of roads connecting smaller towns and bringing together the population that resides in the villages that lie scattered all over the country, is a segment that needs to be treated differently.

Development of these roads is more suitably done using what can be aptly termed intermediate or appropriate technology. Successful execution of road construction in the rural areas in Maharashtra, under the Employment Guarantee Scheme combining labour intensive methods with mechanization, provides an example of sustainable road development. Submersible bridge structures permitting interruption to traffic only for a small duration in the flood seasons, is another example of cost effective and functionally satisfactory solution on relatively unimportant roads.

6. EVALUATING ALTERNATIVE TRANSPORT SYSTEMS IN COLOMBIA

The expansion of urban areas in developing countries presents many transport challenges. Cities are rapidly expanding into the surrounding countryside and new developments create additional traffic demand, which adds to the congestion on the road network. People have aspirations to acquire and use cars. One of the local government's objectives is again usually to provide a good public transport system, to avoid an increase in car ownership. Consequently, public transport is seen as the preferred sustainable transport mode for accommodating the increased travel demand. However, there is a number of alternative public transport modes available, each with its own characteristics. The challenge for public transport providers is to identify the systems that best suit local requirements.

In Cali, Colombia, alternative public transport systems have been evaluated within a framework developed in consultation with key stakeholders in the city, including the central and municipal government authorities and the local integrated public transport authority. The evaluation framework assessed the merits of alternative public transport systems such as light rail, modern tram and articulated bus systems. For each transport option, key indicators such as accessibility, integration, economy, safety and environment were examined.

The findings of the study supported introduction of new articulated buses which provide a transport system which is sustainable, flexible and adaptable to rapidly changing urban circumstances. Road users were shown to gain significant benefits, in the form of reduced congestion, from implementing public transport systems.

7. TESTING A DECISION-MAKING METHOD IN USA AND SOUTH AFRICA

How can sustainable transportation performance measures be identified, quantified, and applied in the transportation decision-making process? Often, a simple and practical framework is needed to assist with identifying appropriate performance measures. In turn, the measures need to be quantified and the appropriate data collected to be of use in the transportation decision-making process.

Performance measures can be developed and applied for transportation corridors across functional classifications, modes, and even countries: the test beds used for the study of transportation decision-making comprised transportation corridors in a developing nation, South Africa, as well as a developed nation, the United States of America.

The strategic planning process lays the foundation for identifying appropriate performance measures. Traffic simulation models and data collection techniques can be used to quantify selected performance measures. An innovative decision-making technique, based on the Multi-Attribute Utility Theory process, can be used to make decisions regarding capital improvements based on the concept of sustainable transportation. Transportation planners and decision-makers can use such a model to identify, quantify, and apply performance measures for sustainable transportation in the transportation decision-making process.

8. CONTROLLING THE ROAD'S IMPACT ON THE ENVIRONMENT IN EUROPE

Which are the indicators to be considered and the methods to be implemented in order to evaluate the road's impact on the environment? Environmental indicators deal with, for example, primary energy consumption, water consumption and the greenhouse effect. Methods used as tools for sustainable development are life cycle analysis and multi-criteria analysis. It is also important to use the right method depending on the subject.

In the industries concerned with road construction, analysis and monitoring has shown progress for many sectors: fuel, cement, aggregates, road building. The analysis has especially brought out the importance of recycling materials and their field of application. For infrastructure development and construction, it is a matter of dealing in practice with sustainable development and how to influence project design and the choice of alignment. A major and essential role is played by consultation at every level of the project process.

9. A EUROPEAN HANDBOOK ON WILDLIFE AND TRAFFIC

One of the radical changes to the landscapes of the past centuries has been the creation and enormous extension of infrastructure networks. Towards the end of the 20th century, the expansion of trunk rail and road networks slowed, but did not cease. In Europe, an ever-denser network of forestry and other minor roads, tracks and trails has extended into the last wildernesses. Canals, pipelines, electricity and telephone networks added their impact to an exponential fragmentation of natural areas, while urbanisation rapidly increased the built-over area.

Habitat fragmentation, the splitting of natural habitats and ecosystems into smaller and more isolated patches, is recognized as one of the most important global threats to the conservation of biological diversity. Habitat fragmentation is mainly a result of changes in land use, but a major impact also results from the barrier effect caused by the construction and use of linear infrastructure of transportation systems.

The project COST Action 341 Habitat fragmentation due to transportation infrastructure started in 1998, and 16 countries and one non-governmental organization have been officially involved in the initiative. The project has produced a review on habitat fragmentation on a European level, based on reports from the participating countries. The project found a strong awareness of the problem throughout Europe and that a diversity of solutions have been tested. However, there is still a need for a systematic approach, retrofitting existing infrastructure where necessary, and integrating concerns on fragmentation in the planning of new ones.

When the need to mitigate fragmentation leads to constructing over- and under-passage solutions, the investment can be quite large. If these solutions are implemented for instance on an existing road, project execution may also be complicated. Many agencies have found it very difficult to mobilise the resources needed. This underlines the importance of avoiding fragmentation in the first place, preserving at least existing habitats intact, or contributing to their rehabilitation if at all possible. Road authorities and other infrastructure agencies also need to be in close cooperation with the local authorities and each other to ensure that such preserved habitats also stay preserved and that wildlife passages are not interrupted by other structures or land use.

The most important outcome of the COST 341 project is the handbook "Wildlife and traffic - A European handbook for identifying conflicts and designing solutions". This is a solution-orientated handbook, based upon the accumulated knowledge of a broad range of experts from the participating countries and from numerous international contacts. It gives practical guidance to the various actors involved in the planning, construction and maintenance of transportation infrastructures.

10. DRAFT CONCLUSIONS

A successful integration of social, economic and environmental requirements is a necessity for any policy aiming at improving the sustainability of the way we develop, maintain and use our transport system. The sustainability of transport does not stand on its own; transport serves the functions of society and can be sustainable only through the manner in which it performs that task. In different countries, in different economies, the task is expressed in different ways.

On managing the transport system:

- Transport has the highest emission growth rate of all economic sectors and at present this growth will continue. Thus, priority should be given to policies and measures which simultaneously address climate change and other negative effects on environment, notably noise, emissions of particulates and ozone formation, as well as congestion.
- As economies develop, the share of public passenger transport and rail freight transport generally declines dramatically. In part, this follows from the changes in economic and social structure, but it is possible and important to focus specific emphasis on active development of public transport services, economy and standards. Too much is lost, if the system cannot offer or take up the new opportunities and alternatives available.

On the role of road transport in development:

- There is a need to put continuous emphasis on some basic aspects of sustainability: maintenance, upgrading rural infrastructure, and traffic safety, especially taking account of non-motorized transport.
- Many strategies targeted at improving accessibility and traffic safety will also restrain emissions - even when reduction is not a goal, it is possible to restrain transport emissions without harming economic growth.
- The technology used should be appropriate for the country and its stage of development. For a developing country, the technology of road construction and maintenance needs to be modulated to the peculiar problems of scarcity of capital and abundance of labour, and a predominantly rural setting.
- The effect of construction, and especially infrastructure construction, on nature remains a fundamental aspect of sustainability. Land take and fragmentation is to a great extent linked to urban sprawl, but large scale linear infrastructures, such as main roads, can have enormous direct as well as indirect impacts in rural and wilderness areas.

On national and regional action:

- In road administration, it is essential to define priorities and to ensure cooperation and coordination between the agencies involved.
- There are decision-making tools to assist in setting priorities, choosing the lines of action and overseeing their implementation. These tools, such as multi-criteria analysis, life cycle assessment, performance evaluation or environmental indicators, can also be fairly straightforward to use. There is, however, a need to ensure that stakeholders understand and accept the use of such tools well before any decisions are made.
- It is important to provide for broad regional cooperation, to ensure that the countries become well acquainted with each others' practice. There is still much room to improve practical understanding of how things are managed in different countries. It is an essential component of successful technology transfer to understand both how solutions are influenced by the country of origin and how the usefulness of such solutions is influenced by the country applying them. It would be an advantage for PIARC as an organization to make these links more visible in its work. In this context, the Technology Transfer Centres can have an important role.

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PART D: MATERIALS

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