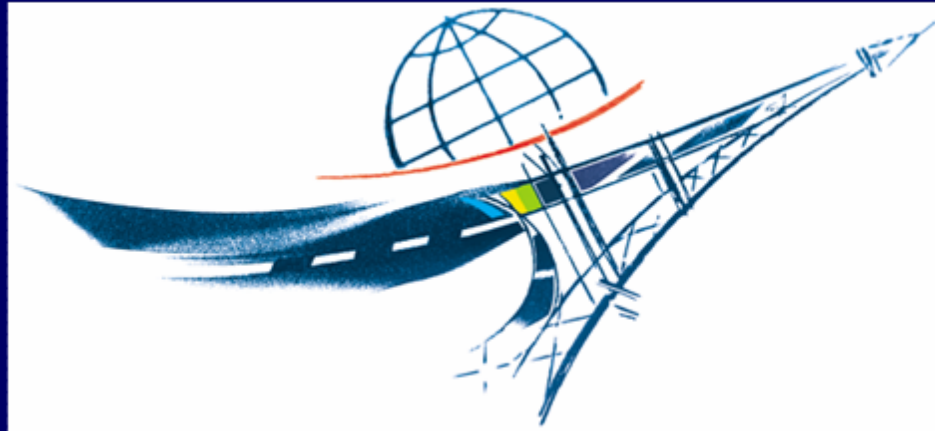


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23RD WORLD ROAD CONGRESS

EARTHWORKS, DRAINAGE AND SUBGRADE

Introduction

19 September 2007 (am)

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Themes studied during the work period 2004-07:

➤ Promoting the optimal use of local materials

The topic is divided in two themes:

- a. Identifying progress in terms of soil and rocky materials treatment for road applications;
- b. Identifying progress in the use of wastes and industrial by-products as earthworks materials.

➤ Having indicators representative of the condition of geotechnical structures for road asset management

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➤ Promoting the optimal use of local materials

- a. Identifying progress in terms of soil and rocky materials treatment for road applications

The main identified progress is dealing with equipment as well as treatment products, methods or technical guidelines:

1. The development of powerful in-situ mixers, enabling mixing very coarse materials and reaching large efficient mixing depths (at least 50 cm).
2. The introduction of low dust emission binders, enabling soil treatment in urban areas or sensitive rural areas, of specific road hydraulic binders, of fast setting binders, blast furnace slags fines, etc...



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The main identified progress is dealing with equipment as well as treatment products, methods or technical guidelines:

3. The treatment of dry and very dry soils treatment with lime milk, the introduction of the method for soils containing sulphates, the application of recycled materials processing (naturals or not), the transfer of treatment techniques from earthworks to road layers.
4. The development of guidelines in the last decade, in many countries, as well as the publication of national and European standards.

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➤ Promoting the optimal use of local materials

b. Identifying progress in the use of wastes and industrial by-products as earthworks materials.

The theme was treaded essentially on the basis of the answers to the survey.

This questionnaire was intended to identify the wastes and by-products used in the different countries as well as the conditions for use in order to characterize these materials from both geotechnical and environmental aspects.

From this survey the following aspects have emerged:

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1. In a general way, all countries have specific standards, more or less prescriptive, governing the use of wastes and industrial by-products in road infrastructures.
2. All European countries have a common legislation, complemented in some cases by national standards.
3. The most common wastes and industrial by-products are demolition concrete (buildings and roads), old pavements bituminous materials, blast furnace slag, fly ashes municipal solid wastes and also tyres, rubber materials or, more rarely, dredging slurries and cellulose wastes.



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From this survey the following aspects have emerged:

4. The use of these materials is variable, depending on their nature and from one country to the other. However, the most frequent uses are in embankments, capping layers or as substitution materials. They are mainly used alone, rarely mixed and very rarely treated.
5. A large development in the use of such materials was observed in road construction over the last decade. The main reasons are the lack of available good quality materials, the limitations to material disposal and, more generally, increasing sustainable development policies and low price of these materials.

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➤ Having indicators representative of the condition of geotechnical structures for road asset management

To date there is relatively little guidance published on the management of geotechnical assets that underlies and supports these other highway assets.

The purpose of this study has been to bridge this gap by reviewing current guidance and practice worldwide then setting out recommendations for future improvement in support of a joined up approach for road infrastructure management.

The highway geotechnical asset principally comprises: embankments and cutting, reinforced and stabilised slopes, subgrade and capping beneath carriageway, structural foundations, environmental/landscape earthworks, ground drainage and landscaping.

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➤ Having indicators representative of the condition of geotechnical structures for road asset management

The challenge of the geotechnical asset is that there is more inherent variability in the engineering performance of such assets than is exhibited by most other elements of the highway network.

This variability and the difficulty in predicting long-term performance poses a significant challenge to asset managers who are seeking to plan and budget the maintenance of their assets.

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To optimise maintenance requires:

1. condition information;
2. an understanding of long term engineering behaviour of the materials and water;
3. a proactive approach to maintenance activities;
4. a holistic approach to any defects that might be identified.

At the core of such a managed approach is effective operational data management from which the condition can be assessed, performance monitored and analyses undertaken.

Performance indicators are key component in an asset management system and condition indicators are a specific type of asset performance indicator.



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Events

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Technical Committee 4.5 has organized or contributed to many events which contributed to the development of high quality international discussions on subjects related to earthworks, drainage and subgrade. Amongst which:

- The meeting of the Technical Committee held in Tsukuba (Japan) on May 25th 2005 which included workshop between members of the committee and their Japanese counterparts interested in the use of industrial by-products and local materials in earthworks. Many communications were presented during the workshop from different countries, including Japan;



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- The meeting of the Technical Committee held in Mexico city on March 30th 2006 which also included a workshop between members of the committee and members of the Mexican Association of roads. Various presentations were made by members of TC 4.5 and Mexican professionals.

- The TREMTI Symposium (on the treatment of soils with lime and hydraulic binders) held in Paris with the collaboration PIARC has benefited from many presentations from members of Technical Committee 4.5, who also participated actively in the Scientific committee of the Symposium.



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- The seminar «Earthworks in Europe» also held in Paris during that same week and also supported by PIARC has been well attended by members of TC 4.5 who contributed to the success of the event.

- Technical Committee 4.5 is also contributing to another PIARC seminar held in Iasi (Rumania) from May 31st to June 2nd by the Professional Association for Roads and Bridges, Moldavian section.

This seminar titled «How to adapt road earthworks to the local environment» has been a good opportunity for technical exchanges between Rumanian professionals and members of TC 4.5.

EARTHWORKS, DRAINAGE AND SUBGRADE Timetable

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9:00	Introduction <i>Mr. Giorgio Peroni (C4.5 Chairperson/ Italy)</i>
9:10	Part 1: Improvements in soil treatment with binders. Report of the working group: <i>Mr. Jean-Claude Auriol (C4.5 member, topic leader/France)</i> Discussion
9:30	Part 2 : Use of wastes and industrial by-products in road construction Report of the working group: <i>Mr. Jean-Claude Auriol (C4.5 member, topic leader/France)</i> Discussion Presentation of individual papers (discussion included)
10:40	Coffee Break
11:10	Part 3: Having indicators representative of the geotechnical structures for road asset management Report of the working group: <i>Mr. David Patterson (C4.5 member, topic leader/United-Kingdom)</i> Discussion Presentation of individual papers (discussion included)
12:30	Conclusion <i>Mr Giorgio Peroni (C4.5 Chairperson/ Italia)</i>