

SUMMARY

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EDITORIAL

RGRA goes European

"Europeanroads review has the ambition of bringing together around a hub for European exchange the players involved in multimodal economic development "

Yves Ghiron, Publication Manager

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Cold mixes paving technology

European Research Project Towards a rational mix design method for cold bituminous mixes

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Synthesis of the principal ideas developed during the project and shows how those could be implemented into a rational mix design method for cold bituminous mixes. Three major topics are developed:

- Contributions of Optel in the field of fundamental understanding.
- Specific tools proposed by Optel that can be used in cold mix design studies.
- A proposal for a framework allowing the development of a rational mix design method for cold mixes.

Juan José Potti, Didier Lesueur, Bernard Eckmann

New Cold Recycling and Mixes Paving Technology

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New bitumen emulsions have been developed based on a unique emulsifier, as well as an improved technique for producing cold mix asphalt and an additive to control the breaking and limit the run off of the emulsion. These emulsions are being used with virgin or recycled materials. After 4 to 7 years of service, the test roads have shown that it's perfectly possible to achieve high performance pavements with cold emulsion based technology.

Ulf Lillbroända, Roger Lundberg, Kenneth Olsson

Advantages, peculiarities and mysteries of emulsion cold mixes

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To improve emulsion cold mixes, it is necessary to understand them better. As will be seen, the tests and methods developed, and widely tested, for hot mixes cannot be applied, as they stand, to cold mixes.

It was therefore necessary to develop a complete and coherent method for evaluating emulsion cold mixes.

Jean-Pierre Serfass

Cold mix asphalt: new methodology of formulation and new products

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Launching of a research programme, the initial objectives of which were very ambitious: to understand the mechanisms of interaction and to monitor the evolution of the binder film over time with aggregates corresponding to different mineralogies and several emulsions. At the same time, the performance of cold mix asphalt was measured and compared with conventional mix design tests using hot mix asphalt as a reference. Two experimental projects led in 2000 and 2001 to validation of the processes developed, for which patent applications were filed.

Bernard Héritier, Sophie Mariotti, Michel Malot

Foamed Bitumen

Cold recycling with foamed bitumen: An innovative technology for structural road rehabilitation

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In the last decade, since the expiry of a patent, the use of foamed bitumen as a binding agent has increased rapidly and is being used in many countries of Europe and in all continents around the world. Arterial and heavily trafficked quarry access roads and even freeways in European countries are just some of the numerous cold recycling projects where the base layer has been constructed with foamed bitumen as a binder.

Thorsten Fröbel, Dr. Gabriele Veith

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The Wirtgen Recycler WR 2500 is pushing the slurry mixer WM 400 whilst mixing in 3.5% by mass foamed bitumen and 2.3% by mass cement

Airport Pavement structures

Use of high modulus asphalt concrete in Airport pavement structures

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High modulus asphalt materials, are derived from conventional materials, namely bituminous concrete and road base asphalt modified by road contractors in order to give them greater rigidity, essentially to reduce the thickness of the pavement structure. High modulus bituminous concrete provides greater resistance to rutting and high modulus asphalt offers better protection of the subgrade.

The improved fatigue resistance of these materials is a major asset for airport pavements. Unlike the highway pavement structural design method, the airport pavement structural design method does not distinguish between high modulus asphalt concrete and conventional materials. French aviation authority Service technique des bases aériennes (STBA), in conjunction with three French road contractors, conducted trials to determine specific equivalence factors of high modulus asphalt concretes.

Eric Parizé, Vinkata Bezavada, Didier Desmoulin, Honoré Goacolou, Jean-Paul Michaut

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**Airport Pavement Structures:
Reference section
completed by Colas**



STBA - M.-A. FROISSART

Resistance to rutting

Anti-rutting solutions

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Rutting is one of the most serious ills that roads can suffer from. In its performance-based approach to mix design, French road engineering practice has got it right: resistance to rutting is one of the four levels of mix performance that road owners insist on. Today, the problem is under control despite the constant increase in traffic and roads carried, and this has been made possible by permanent improvements, both in methods and in products capable of anticipating their effects.

Comité français pour les techniques routières (CFTR)

Continuously Reinforced Concrete Pavements

Trials with a CRC + BBM3 type pavement structure on the Rassats-Favrauds by-pass

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Continuously Reinforced Concrete (CRC), developed in the United States in 1921, has been finding increasing applications in France since 1983 essentially in the case of CRC + lean cement concrete type structures. The aim of the trials conducted on the Rassats-Favrauds by-pass (Angoulême, Charente) of highway RN 141 is to ensure the proper in situ structural behaviour of the innovative pavement structure of the CRC + BBM3 (bitumen bound material) type as predicted by theory, that the FABAC tests seem to indicate, and the structural design of which should offer economic competitiveness with regard to thick bituminous structures.

Xavier Batut, Ludovic Baroin, Pierre-Paul Gabrielli, Gilles Laurent, Bertrand Brusle

Safety-enhancing achievements

High-friction surfacings Road Accident Reduction Techniques

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The United Kingdom has long-standing problems of high traffic density. However, it also has an enviable history of low road accident casualties when compared with other European countries. There are a number of reasons for this, including a drive from successive governments to set accident reduction targets. The need to set such targets has been facilitated by research into the true cost to society of road traffic accidents. It was also realised that about three-quarters of all the road accidents occurred at or within 15m of road junctions. This led to the development of specific road surfacings, and especially of anti skid surfacing.

Keith Dawson, Eur Ing Scott Wardrop, Steven ST John

Safety in urban road tunnels

Tunnels and road enclosures in dutch towns

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Many times people from abroad are wondering why there are tunnels in the Netherlands. They put this question because in their country tunnels are associated with mountains. The first tunnels in the Netherlands however were constructed to pass busy trafficked waterways. Due to the increasing number of inhabitants, the wish to live in spacious houses on floor level and the growth of traffic the quality of life in the cities is threatened. That is why in recent years many new tunnels in towns are under construction or under planning. The goal of this presentation is to indicate what difficulties have been encountered in some projects and what are the possible solutions. The projects are: N14-Sijtwende, A2-Leidsche Rijn and A73 - Roermond.

Ben P. Rigter

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**Roadgrip,
on approach
to junction.
In background
Roadgrip
with coloured
aggregate
for bus lane**



Ringway