



UNIVERSITY
OF PISA



Stellenbosch

ISAP TC APE Working Group 2 Cold Recycling of RA(P)

Kim J. Jenkins (chair)

Alessandro Marradi (Secretary)

Feedback to ISAP TC APE at TRB
13th January 2013



Outline

- Objectives of ISAP WG2 Cold Recycling
- Global perspective – CR research
- Progress to date
- Future activities



Purpose of ISAP WG2

- **Global interface for needs analysis regarding cold recycling**
- **Coordinate research by sharing findings, identifying needs and technical solutions**
- **Promote CR technology by:**
 - **Coordinate publications, guidelines, specifications**
 - **Create a database of research/ project data**
 - **Gather & share info on enviro & sustainability**



ISAP WG2 Members 2012



TOTAL = 34



WG2 Membership = 32

Continent	Members	Countries
Africa	3	1
Asia	10	2
Australasia	1	1
EU	15	5
North America	3	1
South America	2	1



**Cooperation with RILEM TC-SIB
TG6 on Cold Recycling**



Focus of WG2 discussions

- Research focus areas (Global)
 - Laboratory
 - Field (APT and LTPP)
- Key findings and developments
 - Mix design
 - Structural design
 - Specifications
- Publications, documents and manuals



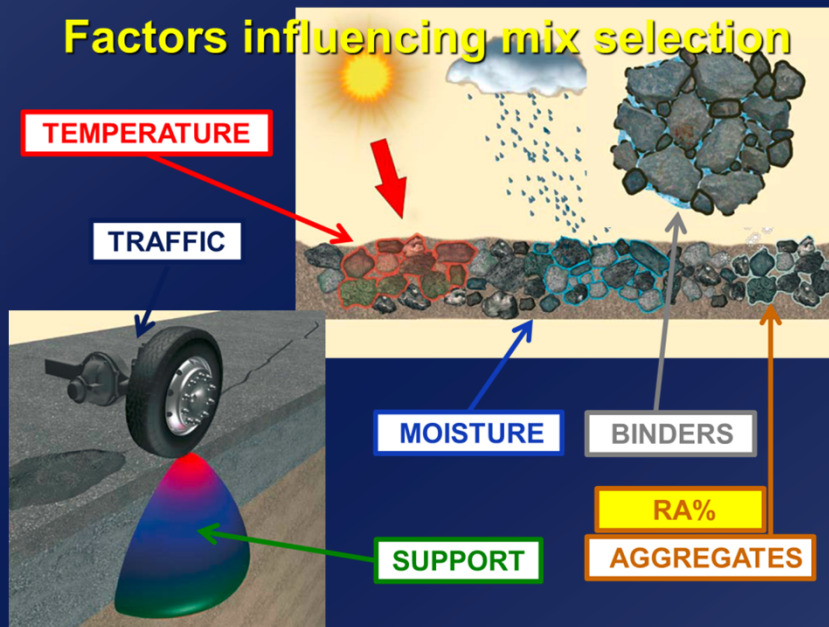
Activities of WG2 in 2012

1. Meeting linked to RILEM Technical Committee 237-SIB TG6 at Delft, The Netherlands on 19th June 2012

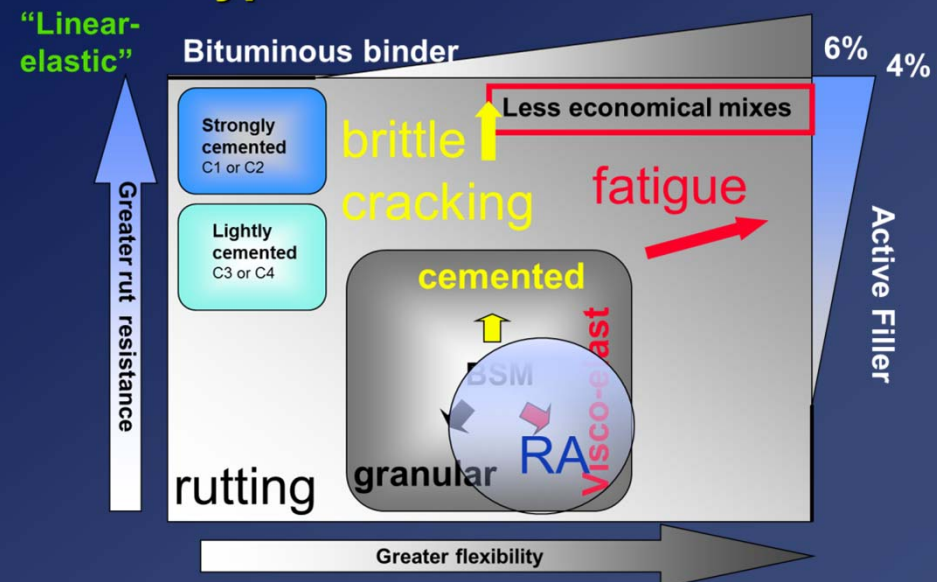
Bitumen Stabilized Materials with High RA %

Kim Jenkins

Factors influencing mix selection



Types of Mix Behaviour





Activities of WG2 in 2012

2. Short Course on RAP Recycling in cooperation with WG1 at *2nd International Symposium on Asphalt Pavements and Environment Fortaleza, Brazil on 30th September 2012*



30 participants



Activities of WG2 in 2012

2. Short Course on RAP Recycling

Chairmen: Gabriele Tebaldi (University of Parma, I)

Elie Hajj (WG1 - University of Nevada, USA)

Kim Jenkins (WG2=University of Stellenbosch, ZA)

Hot Recycling

- Dr. Rebecca S McDaniel (NCSC) - Design Procedures
- Dr. Elie Y. Hajj (UNR) - Evaluation of Performance properties

Cold Recycling

- **Prof Kim Jenkins (UStell) – Mix Design and Laboratory Evaluations**
- **Dr Dave Jones (UCD) - Research results including APT**
- **Mr Dave Collings (Loudon Int) - Cases Study**
- **Dr. Valmir Bonfim (ANE) - Construction Practices**



Activities of WG2 in 2012

3. Cooperation in the organization of International Conference on Sustainable Construction Materials



18-22 Oct 2012 - Wuhan, China



90 delegates

12 different nations and regions



Activities of WG2 in 2012

3. International Conference on Sustainable Construction Materials

In charge of session on:



- **Processing, testing and application of recycled materials**
- **Innovative application of industrial by-products in concrete**
- **Recycled asphalt pavement engineering**



Activities of WG2 in 2012

4. Special Issue of International Journal Road Materials and Pavement Design on Cold Recycling and Bitumen Stabilization

Guest Editors: Gabriele Tebaldi & Kim Jenkins



Editorial

Gabriele Tebaldi & Kim Jenkins

1. **Interpretation of laboratory and full-scale testing of New Zealand foamed bitumen pavements using finite-element modeling**

Alvaro González, Misko Cubrinovski, David Alabaster & Guillermo Thenoux

2. **Compactability and thermal sensitivity of cement-bitumen-treated materials**

Andrea Grilli, Andrea Graziani & Maurizio Bocci

3. **New laboratory testing procedures for mix design and classification of bitumen-stabilized materials**

K. J. Jenkins, M. E. Twagira, R. W. Kelfkens & W. K. Mulusa

4. **Application of MMLS3 in laboratory conditions for moisture damage classification of bitumen stabilized materials**

E. M. Twagira & K. J. Jenkins



Activities of WG2 in 2012

4. Special Issue of International Journal Road Materials and Pavement Design on Cold Recycling and Bitumen Stabilization

Guest Editors: Gabriele Tebaldi & Kim Jenkins



5. **Study of aggregate gradations in foamed bitumen mixes**
Jin-Zhi Xu & Pei-Wen Hao
6. **Investigating in situ stress-dependent behavior of foamed asphalt-treated pavement materials**
Andreas Loizos, Vasilis Papavasiliou & Christina Plati
7. **Laboratory investigation on foamed bitumen bound mixtures made with steel slag, foundry sand, bottom ash and reclaimed asphalt pavement**
Marco Pasetto & Nicola Baldo
8. **New developments with half-warm foamed bitumen asphalt mixtures for sustainable and durable pavement solutions**
M. F.C. van de Ven, B. W. Sluer, K. J. Jenkins & C. M.A. van den Beemt
9. **Practical approach for designing flexible pavements using recycled roadway materials as base course**
Ali Ebrahimi, Brian R. Kootstra, Tuncer B. Edil & Craig H. Benson



Activities of WG2 in 2012

5. Cooperation with TG 6 of Rilem TC SIB for two papers presented at 2nd ISAP APE Symposium in Fortaleza

*papers selected for publication in the Special Issue of
International Journal on Road Materials and Pavement
Design related with 2nd APE Symposium*

Classification of Recycled Asphalt (RA) Material

Gabriele Tebaldi, University of Parma, Italy
Eshan Dave, University of Minnesota Duluth, USA
Paul Marsac, IFSTTAR, France
Patrick Muraya, University of Trondheim, Norway
Martin Hugener, EMPA, Switzerland
Marco Pasetto, University of Padova, Italy
Andrea Graziani, Università Politecnica delle Marche, Italy
Andrea Grilli, University of San Marino, Italy
Alessandro Marradi, University of Pisa, Italy
Louisette Wendling, IFSTTAR, France
Vincent Gaudefroy, IFSTTAR, France
Kim Jenkins, University of Stellenbosch, South Africa
Andreas Loizos, NTUA, Greece
Maurizio Bocci, Università Politecnica delle Marche, Italy

Synthesis of Specimen Preparation and Curing Processes for Cold Recycled Asphalt Mixes

Gabriele Tebaldi, University of Parma, Italy
Eshan Dave, University of Minnesota Duluth, USA
Paul Marsac, IFSTTAR, France
Patrick Muraya, University of Trondheim, Norway
Martin Hugener, EMPA, Switzerland
Marco Pasetto, University of Padova, Italy
Andrea Graziani, Università Politecnica delle Marche, Italy
Andrea Grilli, University of San Marino, Italy
Alessandro Marradi, University of Pisa, Italy
Louisette Wendling, IFSTTAR, France
Vincent Gaudefroy, IFSTTAR, France
Kim Jenkins, University of Stellenbosch, South Africa
Andreas Loizos, NTUA, Greece
Maurizio Bocci, Università Politecnica delle Marche, Italy



Next Activities

- **1 WG meeting** (date and location will be announced)
- **Cooperation with TG6 of Rilem TC SIB on round robin on RAP characterization**
- **STAR on mix design of cold recycling and bitumen stabilized mixtures**

Call for contribution

- **Organization of 3rd APE Symposium**
Announcement, call for paper, committee...
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Next Activities

