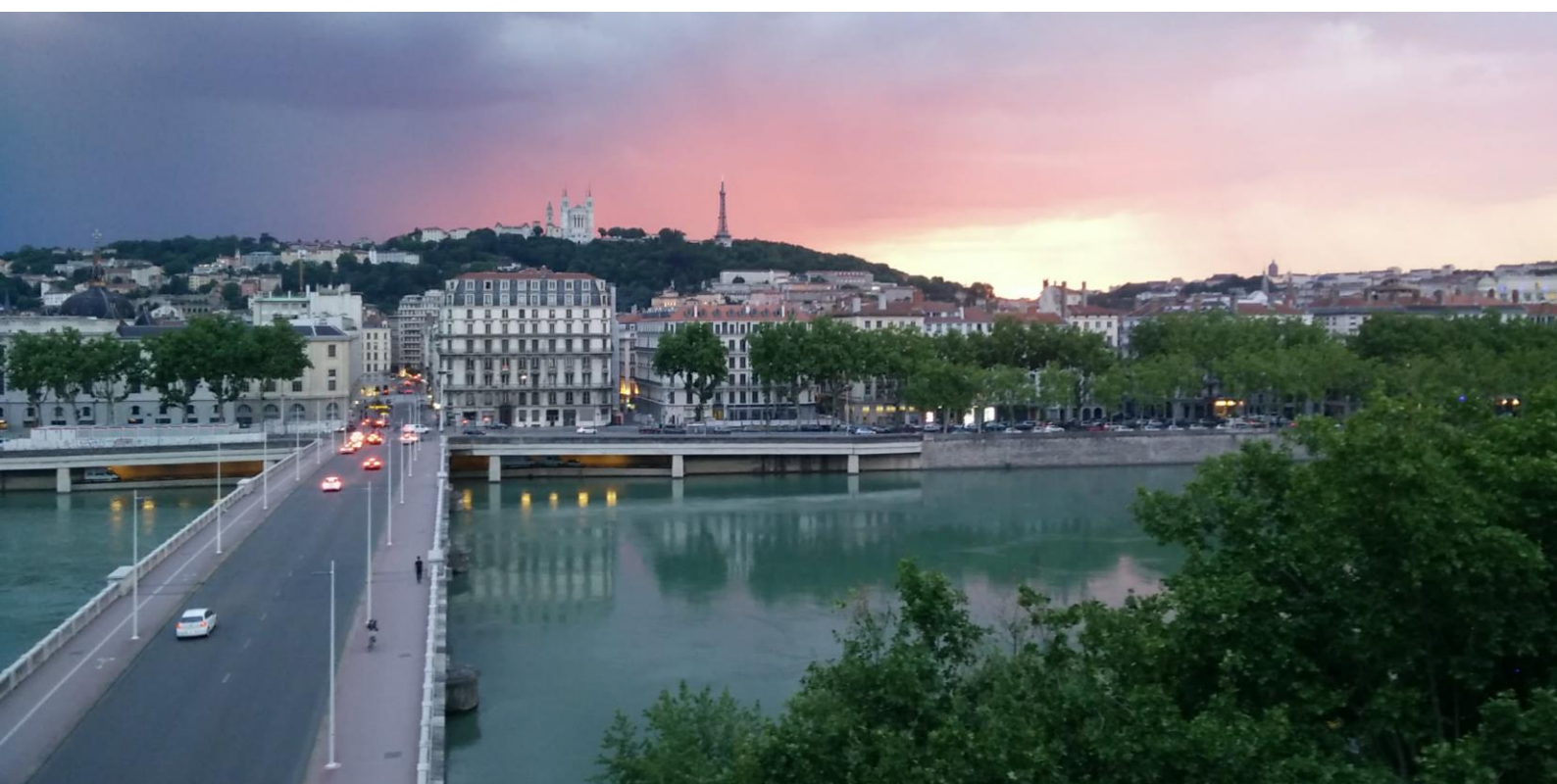


RILEM International Symposium on Bituminous Materials

December 14th – 16th, 2020 – Lyon, France



FINAL PROGRAM



Scientific support



Preface

In the recent years, an increasing number of RILEM Technical Committees (TCs) have been established within Cluster F (“Bituminous Materials and Polymers”) in order to tackle key scientific challenges related to properties of bituminous materials and structures as well as innovative practices in road, railway and airfield infrastructures.

RILEM ISBM Lyon 2020 is the first joint event of three RILEM Technical Committees of Cluster F:

- 264-RAP (“Asphalt Pavement Recycling”)
- 272-PIM (“Phase and Interphase behaviour of bituminous Materials”)
- 278-CHA (“Crack-Healing of Asphalt Pavement Materials”)

The research works, which were presented at the symposium and collected in this volume, span across a very large range of topics in the field. They offer a state-of-the-art picture of the latest advancements on sustainable infrastructures. Among others, the key topics are:

- Recycling
- Phase and interphase behaviour
- Cracking and healing
- Modification and innovative materials
- Durability and environmental aspects
- Testing (laboratory, in situ, accelerated) and modelling
- Multi-scale properties
- Surface characteristics
- Structure performance, modelling and design
- Non-destructive testing
- Back-analysis
- Life Cycle Assessment

All papers accepted for presentation at the conference were reviewed and carefully selected by the Scientific Committee. The significant amount of contributions is a reflection of the richness of scientific and technical work within the domain. The subjects of the articles range from fundamental research on rheology and material damage to applied research on innovative materials and modern technologies in pavement engineering. This incredibly wide spectrum of academic publications demonstrates the flourishing activities of RILEM Cluster F. For several decades, RILEM has been successfully fostering international collaborations between academia and industry, resulting in cutting-edge scientific research and high-impact advancements. This vital network between the main actors of scientific and technological development is paramount for achieving environmental, economic and social sustainability of infrastructures and of civil engineering in general.

Furthermore, the scientific support of three internationally renowned societies: International Society for Asphalt Pavements (ISAP), European Asphalt Technology Association (EATA) and ASTM International, has been necessary for RILEM ISBM Lyon 2020 to reach its objectives in terms of scientific rigor and impact.

We thank all authors, members of the Scientific and Organizing committees and sponsors for their precious contribution to the success of RILEM ISBM Lyon 2020. The conference delivery and the operation of some ancillary activities had to be modified in order to comply with the challenging situation related to the COVID-19 crisis.

Hervé Di Benedetto
Cédric Sauzéat
Salvatore Mangiafico
Hassan Baaj
Emmanuel Chailleux
Gabriele Tebaldi



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RILEM TC 264-RAP: Asphalt Pavement Recycling

Chair: Prof. Gabriele Tebaldi, Università di Parma, Italy

Deputy Chair: Prof. Eshan Dave, Univ. of New Hampshire, USA

TC RAP conducted scholarly research and knowledge dissemination with focus on the asphalt material recycling. The main contribution of the committee was enhancement of the fundamental understanding on the interactions between recycled asphalt (RA) materials and new virgin materials in asphalt paving mixtures. The outcomes of the technical committee will have balance between fundamental developments and knowledge disseminations to aid in improved recycled asphalt mixture design methods and use of life-cycle assessment tools.

Task Groups (TG):

- TG1: Cold Recycling – TG Leaders: Daniel Perraton & Alan Carter, ÉTS Montreal, Canada
- TG2: Non-Cold (Warm and Hot) Recycling – TG Leader: Paul Marsac, Université Gustave Eiffel, France & Mayca Rubio Gamez, University of Granada, Spain
- TG3: Asphalt Binder for Recycled Asphalt Mixtures – TG Leader: Martin Hugener, EMPA, Switzerland & Augusto Cannone Falchetto, University of Alaska Fairbanks, U.S.A.
- TG4: Life Cycle Assessment for Pavements with RA Mixtures – TG Leaders: T. Parry, University of Nottingham, UK & Yaning Qiao, China University of Mining and Technology
- TG 5: Degree of Binder Activation - Davide Lo Presti, University of Palermo, Italy & K. Vasconcelos, University of São Paulo, Brazil



RILEM TC 272-PIM: Phase and Interphase behaviour of bituminous Materials

Chair: Dr. Emmanuel Chailleux, Université Gustave Eiffel, France

Deputy Chair: Dr. Christiane Raab, EMPA, Switzerland

This TC aims to provide recommendations, in term of experimental tools, for the asphalt research and engineering community, concerning performance assessment of innovative bituminous materials. In order to do so it is necessary to understand bituminous materials as multiphase materials and to conduct studies at different scales: binder, mastics, mixture, as well as pavement interfaces.

TC PIM is composed of 3 Task Groups (TG) dealing with 3 scales: binder, mixture and interface behavior. It is proposed to work, at these 3 levels, on the problematic of phase and Interphase behaviour of bituminous Materials. The TG1 looks at understanding performances of complex binders with addition of either additives, polymers, solid particles. TG3 focuses on the Thermal Stress Restrained Specimen Test (TSRST), which is performed to characterize the low temperature performance of mixtures. The TG3 works are based on an Interlaboratory Test on "Dynamic Interlayer Shear Testing" performed on double-layered slabs prepared by the Università Politecnica delle Marche.

Task Groups (TG):

- TG1: Testing of complex and combined binders (even going towards polymers, or compatibility of binders) – TG Leader: Laurent Porot, Kraton Chemical, Netherlands
- TG2: Low temperature performance of mixtures – TG Leader: Cédric Sauzéat, ENTPE, France
- TG3: Pavement multilayer system, dynamic interlayer shear testing – TG Leader: Francesco Canestrari, Università Politecnica delle Marche, Italy



RILEM TC 278-CHA: Crack-Healing of Asphalt Pavement Materials

Chair: Prof. Hassan Baaj, University of Waterloo, Canada

Deputy Chair: Prof. Orazio Baglieri, Politecnico di Torino, Italy

Cracking is one of the most prevalent deterioration modes of flexible pavements. It is caused by traffic loading, low temperature and can be accelerated by oxidation of the asphalt or when the asphalt material performs poorly. In research on asphalt pavement, these issues have often been addressed separately due to the varied reasons for the cracking. The service life of asphalt can be increased significantly if these issues could be addressed with one or a combination of solutions focussed on the prevention and healing of asphalt cracks.

The Technical Committee TC-278 CHA (Crack-Healing of Asphalt Pavement Materials) deals with healing phenomena of asphalt, a subject which is becoming more and more popular in the last decade. The focus is on the development of test methods for the induction of asphalt cracking, quantification of intrinsic self-healing properties as well as on ways to enhance the healing properties of asphalt. The work of the TC should lead to improved durability of structures with less maintenance.

Task Groups (TG):

- TG1: State of the Art Review – TG Leaders: Greet Leegwater, Technical University Delft, Netherlands
- TG2: Laboratory Experimentation – TG Leaders: Ferhat Hammoum, Université Gustave Eiffel, France & Orazio Baglieri, Politecnico di Torino, Italy
- TG3: Numerical Modelling – TG Leader: Christophe Petit, Université de Limoges, France



Conference organization and online attendance

The conference will be in **full virtual mode**. Participants will be able to attend all sessions using **Zoom software**. It is recommended to use the latest version of the Zoom software (5.4.3).

All registered participants will receive a unique connection link for the whole conference. Once connected, **three virtual rooms (A, B and C)** will be available and it will be possible to freely move around sessions using the “Breakout rooms” function of the Zoom software. It will not be possible to change room by using the web client.

All **plenary sessions** (three sessions dedicated to the three **RILEM TCs** of the conference, two **poster sessions, opening and closing ceremonies**) will be hosted in Room A. The **27 parallel sessions** will be hosted in the three rooms: each room will host sessions ending with the corresponding letter (example: session 2.3.B will be hosted in Room B).

The three plenary RILEM TC sessions are managed independently, each by the Chair of the corresponding TC with a specific organization. Therefore, the three plenary TC sessions are not subjected to the rules described hereafter for the other sessions.

During all parallel sessions, presentation videos sent by authors will be automatically displayed every 20 minutes during sessions according to the conference program. After each presentation a maximum time of six minutes will be dedicated to questions, answers and discussions (“Q&A”), managed by each session Chair. During each Q&A time, questions can be asked by all connected participants in two ways. The first possibility is to write the question on the room chat. In this case, either the session Chair reads it (the Chair has no obligation to do it) loud to the authors of the paper being discussed, which will reply orally, or the author can reply by writing on the same chat, even after their Q&A time. The second possibility is to use the “raise hand” function of the Zoom software. The session Chair will be notified that a participant would like to ask a question and will decide whether to allow him/her to open his/her microphone and talk or not.

The best poster award jury has selected 12 posters among all those accepted for the conference. They will be presented during the two poster sessions (six per session) by displaying the short video presentations sent by the authors. Among these 12 posters, two will be awarded the **two Best Poster awards (1st and 2nd place)**. For the poster sessions, the same rules followed for parallel sessions (except for the duration of the Q&A period after each presentation, limited to three minutes) are valid.



Overview program

Monday, December 14th 2020			
GMT +1	ROOM A	ROOM B	ROOM C
10:00 – 10:20	Opening ceremony		
10:20 – 11:20	Parallel session 1.1.A: Binder/Sealing	Parallel session 1.1.B: Healing 1	Parallel session 1.1.C: Modelling 1
11:20 – 11:35	Coffee break		
11:35 – 12:55	Parallel session 1.2.A: Binder 1	Parallel session 1.2.B: Fatigue of bituminous mixtures	Parallel session 1.2.C: Crumb rubber recycling
12:55 – 13:45	Lunch		
13:45 – 14:35	Plenary session 1: RILEM TC 272-PIM Dr. Emmanuel Chailleux		
14:35 – 15:15	Poster session 1		
15:15 – 15:30	Coffee break		
15:30 – 17:10	Parallel session 1.3.A: Emulsions	Parallel session 1.3.B: Healing 2	Parallel session 1.3.C: Recycling 1

Tuesday, December 15th 2020			
GMT +1	ROOM A	ROOM B	ROOM C
10:00 – 11:20	Parallel session 2.1.A: Binder modification	Parallel session 2.1.B: Mixtures and low temperatures 1	Parallel session 2.1.C: Aging 1
11:20 – 11:35	Coffee break		
11:35 – 12:55	Parallel session 2.2.A: Bio-binders	Parallel session 2.2.B: Mixtures and low temperatures 2	Parallel session 2.2.C: Aging 2
12:55 – 13:45	Lunch		
13:45 – 14:35	Plenary session 2: RILEM TC 278-CHA Prof. Hassan Baaj		
14:35 – 15:15	Poster session 2		
15:15 – 15:30	Coffee break		
15:30 – 17:10	Parallel session 2.3.A: Cold recycling	Parallel session 2.3.B: Pavement properties 1	Parallel session 2.3.C: Aging 3



Wednesday, December 16th 2020			
GMT +1	ROOM A	ROOM B	ROOM C
10:00 – 11:20	Parallel session 3.1.A: Recycling 2	Parallel session 3.1.B: VE and permanent deformation of bitum. materials 1	Parallel session 3.1.C: Pavement properties 2
11:20 – 11:35	Coffee break		
11:35 – 12:55	Parallel session 3.2.A: Rejuvenators in bituminous materials	Parallel session 3.2.B: VE and permanent deformation of bitum. materials 2	Parallel session 3.2.C: Miscellaneous
12:55 – 13:45	Lunch		
13:45 – 14:35	Plenary session 3: RILEM TC 264-RAP Prof. Gabriele Tebaldi		
14:35 – 14:50	Coffee break		
14:50 – 16:50	Parallel session 3.3.A: Recycling 3	Parallel session 3.3.B: Cracking of bituminous mixtures	Parallel session 3.3.C: Modelling 2
16:50 – 17:20	Closing ceremony		

Thursday, December 17th 2020	
GMT +1	
9:00 – 12:00	RILEM TC 279-WMR Workshop Valorisation of Waste and Secondary Materials for Roads
12:00 – 13:30	Lunch
13:30 – 16:30	4th RILEM TC 264-RAP Industry Workshop Asphalt Pavement Recycling

NB: Information on Zoom connection links are provided by the organisers to registered participants.



Detailed program

Monday, December 14th 2020

10:00 – 10:20 ROOM A – Opening ceremony

Hervé Di Benedetto
Cédric Sauzéat
Salvatore Mangiafico

10:20 – 11:20 ROOM A – Parallel session 1.1.A: Binder/Sealing

Chairman: Ferhat Hammoum

10:20 – 10:40 L. C. Van Den Kerkhof, *Circular Accelerated Surfacing Tester (CAST) for evaluating chip sealing binders*

10:40 – 11:00 J. Buchheim, C. Recknagel, P. Wolter, K. Kittler-Packmor, *A new approach towards Performance-related design and scientific evaluation of joint sealing systems*

11:00 – 11:20 G. Mesquita, L. Gondim, M. Cavalcante, S. Barroso, *Evaluation of service level of emulsions used in Chip Seal treatments in different stages of UV-induced aging*

10:20 – 11:20 ROOM B – Parallel session 1.1.B: Healing 1

Chairman: Laurent Porot

10:20 – 10:40 R. Varma, R. Balieu, N. Kringos, *A new method for healing quantification of bituminous materials*

10:40 – 11:00 E. Santagata, F. Miglietta, O. Baglieri, L. Tsantilis, *Effect of temperature on self-healing properties of bituminous binders*

11:00 – 11:20 L. Li, Y. Gao, Y. Zhang, *Healing characterisation of waste-derived bitumen based on crack length*

10:20 – 11:20 ROOM C – Parallel session 1.1.C: Modelling 1

Chairman: Ramon Botella

10:20 – 10:40 J.-C. Quezada, C. Chazallon, *Complex modulus modelling of hot asphalt mixes using realistic aggregates*

10:40 – 11:00 F. Fakhari Tehrani, C. Petit, J. Absi, *TSRST heterogeneous modeling for understanding failure depending on asphalt mix design and experimental conditions*

11:00 – 11:20 B. S. Abijith, S. P. Atul Narayan, J. Murali Krishnan, *Influence of confinement pressure on the viscoelastic response of bituminous mixtures*

11:20 – 11:35 Coffee break

11:35 – 12:55 ROOM A – Parallel session 1.2.A: Binder 1

Chairman: Orazio Baglieri

11:35 – 11:55 J. Blom, N. Van Den Brande, H. Soenen, *The influence of wax model compounds on the surface topography of bitumen*

11:55 – 12:15 P. Caputo, V. Loise, F. R. Lupi, E. Lombardo, I. Antunes, *How to improve the miscibility of asphalt binder and polyolefins by phosphoric acid?*



- 12:15 – 12:35 G. Donze-Rangel, C. Bottelin, P. Marchal, M. Chardonnet, L. Vozikis, Y. Hung, *Rheometrics framework analysis to capture self-assemblies organization in bitumen matrix*
- 12:35 – 12:55 M. Elwardany, J.-P. Planche, J. Adams, *Sensitivity analysis for rheological determination of glass transition and crossover temperatures at various reference frequencies*
- 11:35 – 12:55 ROOM B – Parallel session 1.2.B: Fatigue of bituminous mixtures**
Chairman: Andrea Graziani
- 11:35 – 11:55 I. Santos, P. Marsac, O. Chupin, F. Hammoum, *Numerical simulation of two-point and four-point bending fatigue test on asphalt mix with intrinsic material parameters based on Digital Image Correlation cracking data*
- 11:55 – 12:15 H. Sahebzamani, M. Z. Alavi, O. Farzaneh, S. Krafft, *Effects of binder content, filler content, air void and modification on damage characteristics of asphalt mix under fatigue loading*
- 12:15 – 12:35 A. Margaritis, G. Pipintakos, L. M. Zhang, G. Jacobs, C. Vuye, J. Blom, W. Van Den Bergh, *Introducing an improved testing method to evaluate the fatigue resistance of bituminous mortars*
- 12:35 – 12:55 M. Steineder, L. Eberhardsteiner, B. Hofko, *Prediction of fatigue behaviour of asphalt mix from tests on asphalt mastic*
- 11:35 – 12:55 ROOM C – Parallel session 1.2.C: Crumb rubber recycling**
Chairman: Davide Lo Presti
- 11:35 – 11:55 L. Petho, *Implementing crumb rubber gap-graded and open graded asphalt technologies – the Australian experience*
- 11:55 – 12:15 Z. Leng, X. Xu, J. Lan, R. Li, A. Sreeram, *Rubber-bitumen interaction of plant-blended rubberized bitumen prepared under various blending conditions*
- 12:15 – 12:35 M. Moises, L. Poulikakos, *Large scale characterization of crumb rubber modified asphalt mixtures using dry process*
- 12:35 – 12:55 Y. Mahmoudi, S. Mangiafico, C. Sauzéat, H. Di Benedetto, S. Pouget, J.-P. Faure, *Experimental evaluation of swelling and absorption of crumb rubber aggregates*
- 12:55 – 13:45 **Lunch**
- 13:45 – 14:35 ROOM A – Plenary session 1: RILEM TC 272-PIM**
Chairman: Emmanuel Chailleux
- F. Canestrari, T. Attia, H. Di Benedetto, A. Graziani, P. Jaskula, Y. R. Kim, M. Maliszewski, J. Pais, C. Petit, C. Raab, D. Ragni, D. Rys, C. Sangiorgi, C. Sauzéat, A. Zofka, *Interlaboratory test to characterize the cyclic behavior of bituminous interlayers: an overview of testing equipment and protocols*
- L. Porot, E. Chailleux, P. Apostolidis, J. Zhu, A. Margaritis, L. Tsantilis, *Complex bituminous binders, are current test methods suitable for?*
- 14:35 – 15:15 ROOM A – Poster session 1**
Chairman: William G. Buttlar



R. Freire, H. Di Benedetto, C. Sauzéat, S. Pouget, D. Lesueur, *Effect of fiberglass geogrid reinforcement to fatigue resistance of bituminous mixtures*

B. Pouteau, A. Martin, K. Berrada, J.-A. Decamps, P. Diez, *Impact of the performance of the asphalt concrete and the geogrid materials on the fatigue of geogrid-reinforced asphalt concrete – experimental study*

D. Vizzari, E. Genesseeux, S. Lavaud, S. Bouron, E. Chailleux, *Surface dressing treatment for applications on solar roads*

N. Viscione, F. Russo, R. Veropalumbo, C. Oreto, *Assessing geometric features impact of laboratory specimens on ITS variation*

C. Brondani, C. Faccin, K. W. Kraemer, F. D. Boeira, L. Pivoto Specht, A. V. Nummer, *Asphalt aggregate adhesion: Study of the influence of the morphological, chemical and mineralogical properties of different aggregates from southern Brazil*

D. Ramirez Cardona, H. Di Benedetto, C. Sauzeat, N. Calon, *Fatigue and moisture damage resistance of bituminous mixtures for railway trackbeds*

15:15 – 15:30 Coffee break

15:30 – 17:10 ROOM A – Parallel session 1.3.A: Emulsions

Chairman: Gordon Airey

A. Thiriet, J.-M. Piau, E. Chailleux, F. Delfosse, C. Leroy, V. Gaudefroy, *Assessment of the behavior of emulsified asphalt mixes during curing*

A. Al-Mohammedawi, K. Mollenhauer, *A comparative study on the fatigue behavior of bitumen emulsion mastic, modified with various active fillers*

M. Miljkovic, A. Graziani, C. Mignini, *Interphase relations in the characterisation of bitumen emulsion-cement composites*

S. Jatav, P. Bouriât, P. Anacleat, Y. Hung, F. Rondelez, C. Dicharry, *Roles of exogenous cationic and endogenous bitumen surfactants in the stability of Bitumen/Water Interfaces*

W. Sorociak, K. Konieczna, J. B. Król., D. Żymełka, K. J. Kowalski, *Evaluation of aging processes in binders stabilised from cationic bituminous emulsion*

15:30 – 17:10 ROOM B – Parallel session 1.3.B: Healing 2

Chairman: Eshan Dave

N. Ruiz-Riancho, T. Saadoon, A. Garcia, R. Hudson-Griffiths, *Enhanced self-healing properties in stone mastic asphalt with encapsulated bitumen rejuvenators*

R. Aurilio, M. Aurilio, H. Baaj, *The effect of a chemical warm mix additive on the self-healing capability of bitumen*

L. Leite, F. Aragão, T. Macedo, P. Osmari, M. Cravo, L. Nascimento, L. Dantas, *Effects of chemical and microstructural constituents on the healing characteristics of asphalt binders*

J.-L. Le, M. Marasteanu, J. Matias De Oliveira, M. Turos, *Investigations of electrical conductivity of Graphite Nano-Platelet (GNP)-taconite modified asphalt binders*



- 16:50 – 17:10 A. Gonzalez, J. Valderrama, J. Norambuena-Contreras, *Microwave crack-healing capability on asphalt mixtures with silicon carbide*
- 15:30 – 17:10 ROOM C – Parallel session 1.3.C: Recycling 1**
Chairwoman: Jo Sias
- 15:30 – 15:50 N. Garg, H. Kazmee, L. Ricalde, *Use of Recycled Asphalt Pavement (RAP) in Airport Pavements*
- 15:50 – 16:10 S. Noto, S. Mangiafico, E. Romeo, C. Sauzéat, H. Di Benedetto, G. Tebaldi, *Experimental tests on diffusion phenomenon between two different bitumens*
- 16:10 – 16:30 W. L. G. Ferreira, V. Castelo Branco, K. Vasconcelos, A. Bhasin, *Evaluate the impact of Reclaimed Asphalt Pavement (RAP) binder activation on its shape properties*
- 16:30 – 16:50 F. Martinho, L. Picado-Santos, F. Lemos, *New modified recycled mastic for demanding and sustainable asphalt mixtures*
- 16:50 – 17:10 A. Filonzi, R. Hajj, S. Komaragiri, A. Bhasin, *Investigating the use of a binder cohesion test to evaluate cracking resistance of asphalt mixtures*

Tuesday, December 15th 2020

10:00 – 11:20 ROOM A – Parallel session 2.1.A: Binder modification

- Chairwoman: Greet Leegwater
- 10:00 – 10:20 G. White, *Comparing wet mixed and dry mixed binder modification with recycled waste plastic*
- 10:20 – 10:40 Q. T. Nguyen, T. T. N. Hoang, X. C. Bui, V. C. La, T. K. D. Tran, Q. P. Nguyen, N. H. Nguyen, *Mechanical properties of bitumen and asphalt mixture modified with polymer additives*
- 10:40 – 11:00 R. Patel, V. Nanjegowda, M. Jagadeesh, B. Krishna Prapoorna, *Characterization of aluminosilicate-based warm-mix asphalt additive using experimental techniques*
- 11:00 – 11:20 F. Xiao, W. Jiayu, *Rheological properties of derived fractions composed of aromatics, resins, and asphaltenes*

10:00 – 11:20 ROOM B – Parallel session 2.1.B: Mixtures and low temperatures 1

- Chairman: Christophe Petit
- 10:00 – 10:20 A. Figueroa, M. Solaimanian, *Humidity Damage Index (HDI) of recovered asphalt from Reclaimed Asphalt Pavement (RAP) using different aggregates*
- 10:20 – 10:40 D. T. Tran, C. Sauzéat, H. Di Benedetto, B. Pouteau, *Effects of water saturation and freeze-thaw cycles on fatigue behaviour of bituminous mixtures*
- 10:40 – 11:00 D. Lesueur, P. Metais, P. Pibis, S. El Bedoui, H. Ruat, S. Bouron, F. Hammoum, *Improving the durability of asphalt mixtures with hydrated lime: Field results from recent French sections*
- 11:00 – 11:20 L. Lovqvist, J. Zhu, R. Balieu, N. Kringos, *A critical analysis of the standard used to evaluate de-icing damage in asphalt materials*



10:00 – 11:20 ROOM C – Parallel session 2.1.C: Aging 1

Chairwoman: Lily Poulikakos

10:00 – 10:20 G. Pipintakos, U. Muhlich, H. Soenen, A. Varveri, S. Van Doorslaer, H. Y. V. Ching, P. Sjøvall, *Experimental validation of the dual-oxidation routes in bituminous binders*

10:20 – 10:40 J. Mirwald, S. Werkovits, I. Camargo, D. Maschauer, B. Hofko, H. Grothe, *Time and surface dependent effects of bitumen - Comparison of surface and bulk*

10:40 – 11:00 M. Guo, H. Liu, Y. Jiao, Y. Tan, *Study on reversibility of aging and recycling of bitumen based on rheology, adhesion and chemical properties*

11:00 – 11:20 H. Soenen, X. Carbonneau, X. Lu, C. Robertus, T. Benoit, *Evaluation of the properties of bituminous binders recovered from various sites in Europe*

11:20 – 11:35 Coffee break

11:35 – 12:55 ROOM A – Parallel session 2.2.A: Bio-binders

Chairman: Fernando Moreno-Navarro

11:35 – 11:55 J. Blanc, E. Chailleux, P. Hornych, C. Williams, Z. Sotoodeh-Nia, L. Porot, S. Pouget, *From laboratory mixes to full scale test: rutting evaluation of bio-recycled asphalt mixes*

11:55 – 12:15 V. Gaudefroy, D. Lo Presti, L. Porot, S. Pouget, J.-P. Planche, C. Williams, E. Chailleux, *Organic compounds evaluation from fumes generated in laboratory by bio-recycled asphalt mixtures*

12:15 – 12:35 A. Weir, G. Airey, C. Snape, A. Jimenez Del Barco Carrion, *Rheological characterisation of modified bitumens with biodiesel-derived biobinders*

12:35 – 12:55 L. Espinosa Ruiz, F. Gadler, R. V. Mota, K. Vasconcelos, L. L. B. Bernucci, *Comparison between rheological behavior of a neat asphalt binder and a bio-binder from renewable source*

11:35 – 12:55 ROOM B – Parallel session 2.2.B: Mixtures and low temperatures 2

Chairman: Manfred Partl

11:35 – 11:55 W. Bańkowski, M. Gajewski, R. Horodecka, K. Mirski, *Laboratory assessment of low temperature resistance of high modulus asphalt concrete in relation to climatic conditions in Poland*

11:55 – 12:15 S. S. Kim, M. Akentuna, M. Nazzal, *Coefficient of thermal expansion and thermally induced internal cracking of asphalt mixes*

12:15 – 12:35 Y. Berraha, D. Perraton, G. Doré, M. Vaillancourt, *Cracked asphalt pavement behaviour under thermal and load cycles - Laboratory investigation using accelerated loading system*

12:35 – 12:55 C. Neyret, S. Lamothe, D. Perraton, A. Carter, M. Proteau, H. Di Benedetto, B. Pouteau, *Investigation of cold regions dense graded high modulus asphalt concrete sensitivity to bitumen and filler content*

11:35 – 12:55 ROOM C – Parallel session 2.2.C: Aging 2

Chairwoman: María del Carmen Rubio-Gámez

11:35 – 11:55 A. Gudmarsson, A. Ahmed, *Monitoring stiffness evolution of asphalt concrete through modal analysis*

11:55 – 12:15 D. Maschauer, J. Mirwald, B. Hofko, H. Grothe, *Viennese Aging Procedure (VAPro): adaption for low-temperature testing*



- 12:15 – 12:35 R. Jing, A. Varveri, X. Liu, T. Scarpas, S. Erkens, *Ageing behaviour of porous and dense asphalt mixtures in the field*
- 12:35 – 12:55 R. Siroma, M. L. Nguyen, P. Hornyk, E. Chailleux, *A literature review of bitumen aging: from laboratory procedures to field evaluation*
- 12:55 – 13:45 **Lunch**
- 13:45 – 14:35 **ROOM A – Plenary session 2: RILEM TC 278-CHA**
Chairman: Hassan Baaj
G. Leegwater, A. Taboković, O. Baglieri, F. Hammoum, H. Baaj, *Terms and definitions on crack-healing and restoration of mechanical properties in bituminous materials*
O. Baglieri, H. Baaj, F. Canestrari, C. Wang, F. Hammoum, L. Tsantilis, F. Cardone, *Testing methods to assess healing potential of bituminous binders*
- 14:35 – 15:15 **ROOM A – Poster session 2**
Chairman: William G. Buttlar
A. Forton, S. Mangiafico, C. Sauzéat, H. Di Benedetto, P. Marc, *Estimation of complex shear modulus of binder blends produced with RAP binder and rejuvenator*
O. Eman, Y. Zhang, *Multiphysics simulation and validation of field ageing of asphalt pavements*
G. Giancontieri, S. Pouget, D. Lo Presti, *Improved testing setup for real-time monitoring of PMBs during manufacturing and rotational viscosity measurements*
F. Preti, B. Chagas Silva Gouveia, E. Romeo, G. Tebaldi, E. V. Dave, J. E. Sias, *Elasto-plastic model for bitumen stabilized materials using triaxial testing and finite element modelling*
D. Grossegger, A. Garcia, G. Airey, *Crack Self-Healing in Asphalt as a Flow Process*
M. Aurilio, H. Baaj, *Examining the effects of a self-healing elastomer on the properties of bitumen*
- 15:15 – 15:30 **Coffee break**
- 15:30 – 17:10 **ROOM A – Parallel session 2.3.A: Cold recycling**
Chairman: Alan Carter
15:30 – 15:50 L. Gaillard, C. Chazallon, P. Hornyk, J.-C. Quezada, J.-L. Geffard, *The influence of the mastic coating of untreated reclaimed asphalt pavement on the permanent and resilient behaviours*
15:50 – 16:10 C. Mignini, F. Cardone, A. Graziani, *Experimental study on the grading distribution of cold recycled asphalt mixtures produced with bitumen emulsion and high strength cement*
16:10 – 16:30 B. Chagas Silva Gouveia, F. Preti, E. Romeo, J. Sias, E. Dave, G. Tebaldi, *Rutting performance analysis for pavements with bituminous stabilized mixtures as base layers*
16:30 – 16:50 W. Ma, D. Wang, F. Gu, A. Taylor, R. West, *Effect of RAP and binder properties on indirect tensile strength and dynamic modulus of cold recycled foamed asphalt mixtures with high RAP content*



16:50 – 17:10 C. Ogbo, E. Dave Eshan, J. Sias, *Laboratory performance of Stabilized base with 100% Reclaimed Asphalt Pavement (RAP) using Portland cement, bitumen emulsion and foamed-bitumen*

15:30 – 17:10 ROOM B – Parallel session 2.3.B: Pavement properties 1

Chairman: Daniel Perraton

15:30 – 15:50 X.-Q. Le, M. L. Nguyen, P. Horny, Q. T. Nguyen, *Evaluation of pavement damage through the analysis of asphalt layer modulus and strain evolutions during an accelerated pavement test*

15:50 – 16:10 J.-C. Carret, A. Carter, *Effects of adding a geotextile into a pavement structure on FWD experimental data and estimated pavement remaining service life*

16:10 – 16:30 M. Gharbi, M. Broutin, I. Boulkhemair, M. L. Nguyen, A. Chabot, *Analysis of ovalization measurements on flexible airfield pavement under HWD dynamic impulse load*

16:30 – 16:50 F. Tarpoudi Baheri, T. Schutzius, L. Poulikakos, D. Poulikakos, M. Rico Luengo, *The effect of additives on water vapor condensation on bituminous surfaces*

16:50 – 17:10 J. Habbouche, P. Sebaaly, E. Hajj, M. Piratheepan, *Full-scale pavement testing of a high polymer modified asphalt concrete mixture*

15:30 – 17:10 ROOM C – Parallel session 2.3.C: Aging 3

Chairman: Denis Jelagin

15:30 – 15:50 J. Noel, M. Rezwan Quddus, P. Pirzadeh, P. Kriz, R. Shirts, *Comparison of Alternate Binder Aging Methods*

15:50 – 16:10 R. Zhang, J. Sias, E. Dave, *Evolution of the thermo-rheological indices of asphalt binders with aging*

16:10 – 16:30 A. Baldi, R. E. Villegas-Villegas, J. P. Aguiar-Moya, L. G. Loria-Salazar, *The chemistry behind rheological and thermal transitions of oxidized bitumen*

16:30 – 16:50 R. Hossain, S. Arafat, D. Salomon, N. Wasiuddin, *A comparative study of RTFO, PAV and UV aging using FT-IR and DSR Tests*

16:50 – 17:10 J. Adams, M. Elwardany, J.-P. Planche, Y. Hung, J. Zhu, S. Schroeder, M. Mouazen, *Multi-criteria framework to evaluate the oxidative ageing resistance of bitumen binders*

Wednesday, December 16th 2020

10:00 – 11:20 ROOM A – Parallel session 3.1.A: Recycling 2

Chairman: Emiliano Pasquini

10:00 – 10:20 G. White, A. Jamshidi, *Extending the use of RAP in airport asphalt resurfacing*

10:20 – 10:40 G. Ferrotti, F. Canestrari, J. Xiaotian, F. Cardone, *Use of modified reclaimed asphalt in warm mixtures*



- 10:40 – 11:00 K. L. Roja, B. Vajipeyajula, E. Masad, *Multi-scale evaluation of asphalt binders containing different proportions of Reclaimed Asphalt Pavement (RAP)*
- 11:00 – 11:20 N. Vlasopoulos, N. Tapsoba, D. T. Dao, H. Di Benedetto, C. Sauzéat, M. Ech, N. Miravalls, *Impact of viscoelastic and fatigue behavior of asphalt mixtures made with RAP and asphalt shingle on the life cycle assessment results*
- 10:00 – 11:20 ROOM B – Parallel session 3.1.B: Viscoelasticity and permanent deformation of bituminous materials 1**
Chairman: Paul Marsac
- 10:00 – 10:20 J. Buchner, M. P. Wistuba, T. Hilmer, *Creep properties of asphalt binder, asphalt mastic and asphalt mixture*
- 10:20 – 10:40 B. Lira, J. Ekblad, R. Lundstrom, *Influence of aggregate gradation on the permanent deformation of asphalt mixtures*
- 10:40 – 11:00 G. Airey, J. Sias, H. Di Benedetto, G. Rowe, C. Sauzéat, *Black space evaluation of performance and distress mechanisms in asphalt materials*
- 11:00 – 11:20 S. Benaboud, M. Takarli, F. Allou, F. Dubois, A. Nicolaï, B. Pouteau, A. Beghin, *Efficiency of ultrasonic pulse velocity test in the determination of residual asphalt mix pavement properties*
- 10:00 – 11:20 ROOM C – Parallel session 3.1.C: Pavement properties 2**
Chairman: Andreas Loizos
- 10:00 – 10:20 P. Rossel, J. Perret, M. Ould-Henia, M. Delaby, *An investigation on longitudinal unevenness indicators and their potential on surface characterisation*
- 10:20 – 10:40 M. Kane, *Determining the prominence of texture scales on road skid resistance*
- 10:40 – 11:00 D. Ramirez Cardona, S. Pouget, F. Olard, G. Van Der Houwen, M. Vlak, S. Sénéchal, N. Calon, *A new bituminous ballast-less and sleeper-less thin railway track structure*
- 11:00 – 11:20 D. Khairallah, J. Blanc, P. Hornych, L.-M. Cottineau, J.-M. Piau, O. Chupin, D. Ramirez Cardona, *Monitoring of railway structures of high-speed line Bretagne - Pays de la Loire with bituminous (GB) and granular sublayers (UGM)*
- 11:20 – 11:35 **Coffee break**
- 11:35 – 12:55 ROOM A – Parallel session 3.2.A: Rejuvenators in bituminous materials**
Chairman: Bernhard Hofko
- 11:35 – 11:55 M. Orešković, L. Porot, S. Trifunović, G. Mladenović, *Empirical, rheological and chemical properties of aged binder with rejuvenators at different ageing levels*
- 11:55 – 12:15 N. Piérard, S. Vansteenkiste, A. Vanelstraete, P. Peaureaux, *Methodology for evaluating the performance of bituminous binders based on rheological indicators: impact of the use of a rejuvenator*
- 12:15 – 12:35 D. Dalmazzo, L. Urbano, P. P. Riviera, E. Santagata, *Testing of reclaimed asphalt model systems for the evaluation of the effectiveness of rejuvenators*



- 12:35 – 12:55 E. Bocci, E. Prosperi, P. Marsac, *Rheological modelling of the bitumen from reclaimed asphalt with rejuvenation and re-ageing*
- 11:35 – 12:55 ROOM B – Parallel session 3.2.B: Viscoelasticity and permanent deformation of bituminous materials 2**
Chairman: Francesco Canestrari
- 11:35 – 11:55 P. Tavassoti, T. Hama Ameen, G. Cascante, H. Baaj, *Improving the predictive master curve of bituminous mixtures using ultrasonic measurements*
- 11:55 – 12:15 E. Paniz Possebon, L. Pivoto Specht, H. Di Benedetto, S Lisboa. Schuster, D. da Silva Pereira, *Rheological properties and 2S2P1D modeling of seven bituminous mixtures with different brazilian bitumens*
- 12:15 – 12:35 A. Vale, J. Bastos, J. Soares, *Evaluate the new approach for characterizing the performance of asphalt binders through the multiple stress creep and recovery test*
- 12:35 – 12:55 T. B. Moghaddam, H. Baaj, *Effects of aggregate shape parameters and gradation on High-Modulus Asphalt mix performance*
- 11:35 – 12:55 ROOM C – Parallel session 3.2.C: Miscellaneous**
Chairwoman: Christiane Raab
- 11:35 – 11:55 P. Jaskula, M. Stienss, D. Rys, C. Szydlowski, *The use of direct shear test for optimization of interlayer bonding under a poroelastic layer*
- 11:55 – 12:15 C. Holldorb, A. Brzuska, S. Cypra, M. Oeser, N. Carreno, M. Zeilinger, *Sustainability assessment of novel performance enhancing chemical bitumen additive*
- 12:15 – 12:35 M. C. Rubio-Gámez, F. Moreno-Navarro, J. Sierra, M. Sol-Sanchez, *A laboratory procedure for improving the design of road rehabilitation actions: study of a real case in a highway pavement*
- 12:35 – 12:55 M. Mouazen, Y. Hung, S. Krafft, F. Geisler, A. Ngo, O. Moglia, V. Gaudefroy, *GLOBE: An innovative technical solution to ensure waste free cold logistics of bituminous binders and pavement materials characterization*
- 12:55 – 13:45 **Lunch**
- 13:45 – 14:35 ROOM A – Plenary session 3: RILEM TC 264-RAP**
Chairman: Gabriele Tebaldi
- D. Wang, A. Cannone Falchetto, M. Hugener, L. Porot, A. Kawakami, B. Hofko, A. Grilli, E. Pasquini, M. Pasetto, H. Tabatabaee, H. Zhai, M. Sá da Costa, H. Soenen, P. Kara De Maeijer, W. Van den bergh, F. Cardone, A. Carter, K. Vasconcelos, X. Carbonneau, A. Lorserie, G. Mladenović, M. Orešković, T. Koudelka, P. Coufalik, E. Bocci, R. Zhang, E. Dave, G. Tebaldi, *Effect of aging on the rheological properties of blends of virgin and rejuvenated RA binders*
- P. Marsac, E. Bocci, F. Cardone, A. Cannone Falchetto, X. Carbonneau, M. Zaumanis, A. Carter, M. C. Rubio-Gámez, M. Del Sol Sánchez, E. V. Dave, G. Tebaldi, *International evaluation of the performance of Warm Mix Asphalts with high Reclaimed Asphalt content*
- A. Grilli, S. Raschia, D. Perraton, A. Carter, A. Rahmanbeiki, P. Kara De



Maeijer, D. Lo Presti, G. Airey, C. Ogbo, E. V. Dave, G. Tebaldi,
Experimental investigation on water loss and stiffness of CBTM using different RA sources

14:35 – 14:50 Coffee break

14:50 – 16:50 ROOM A – Parallel session 3.3.A: Recycling 3

Chairwoman: Kamilla Vasconcelos

14:50 – 15:10 M. Pasetto, E. Pasquini, G. Giacomello, F. Moreno-Navarro, R. Tauste-Martinez, A. Cannone Falchetto, M. Vaillancourt, *An interlaboratory test program on the extensive use of waste aggregates in asphalt mixtures: preliminary steps*

15:10 – 15:30 A. Pedraza, C. Sauzéat, H. Di Benedetto, S. Pouget, *Properties at low temperatures of warm mix containing high content of multi-recycled RAP*

15:30 – 15:50 P. Pirzadeh, H. Baaj, *Tracking degree of blending between recycled and virgin binder through asphalt mix phase angle*

15:50 – 16:10 Y. Yan, D. Hernando, B. Park, G. Tebaldi, R. Roque, *Effect of RAP gradation on fracture tolerance of asphalt mixtures*

16:10 – 16:30 A. Daoudi, A. Dony, A. Carter, L. Ziyani, D. Perraton, *Combined recycling of RAS and RAP: Experimental and modeling approach*

16:30 – 16:50 P. Rath, J. Meister, B. Jahangiri, H. Majidifard, W. Buttlar, *Evaluation of Engineered Crumb Rubber (ECR) performance characteristics, including warm-mix equivalence with polymer, draindown prevention, and release enhancement*

14:50 – 16:50 ROOM B – Parallel session 3.3.B: Cracking of bituminous mixtures

Chairman: Michael Wistuba

14:50 – 15:10 R. Botella, F. E. Pérez-Jiménez., R. Miró, A. H. Martínez, T. López-Montero, *Temperature and loading rate susceptibility of bituminous mixtures on monotonic testing*

15:10 – 15:30 C. Raab, M. Arraigada, H. Ibrahimi, *Analysis of low temperature cracking behaviour at binder, mastic and asphalt concrete levels*

15:30 – 15:50 K. Haslett, E. Dave, J. Sias, *Evaluation of cracking performance indices from disk-shaped compact tension testing*

15:50 – 16:10 L. Leon, K. Bovell, *Evaluation of fracture resistance of SMA mixtures with various percentages of TLA-RAP through the semi-circular bend (SCB) test*

16:10 – 16:30 H. Bahia, J. Jiang, *Mortar thickness distribution and its relationship to aging and cracking resistance of asphalt mixtures*

16:30 – 16:50 L. Jiao, J. Harvey, M. Elkashef, R. Wu, D. Jones, *Evaluating the cracking performance of asphalt mixes using four-point bending beam fatigue and semicircular bending testing*

14:50 – 16:50 ROOM C – Parallel session 3.3.C: Modelling 2

Chairman: Imad Al-Qadi

14:50 – 15:10 Q. Adam, G. Englmaier, E. Levenberg, A. Skar, *Active Mitigation of Low-Temperature Cracking in Asphalt Pavements*



- 15:10 – 15:30 J.-M. Roussel, H. Di Benedetto, C. Sauzéat, M. Broutin, *Influence of linear viscoelastic behavior of layer interface for heavy weight deflectometer test*
- 15:30 – 15:50 H. Fadil, D. Jelagin, M. Partl, *Predicting the master curve of bituminous mastics with micromechanical modeling*
- 15:50 – 16:10 L. De Oliveira, L. Da Silva, L. Babadopulos, J. Soares, *Relationship between linear viscoelastic properties of asphalt binders and the corresponding mixtures*
- 16:10 – 16:30 M. Xu, J.-L. Le, T. Yan, M. Turos, M. Marasteanu, D. Feng, *Investigation of Fracture Behavior of Recycled Asphalt Mixtures using a Discrete Element Computational Model*
- 16:30 – 16:50 Z. You, L. You, Q. Dai, T. Spyriouni, *Understanding of structural and rheological properties of asphalt model using molecular dynamics simulation*
- 16:50 – 17:20 ROOM A – Closing ceremony**
Hervé Di Benedetto
Cédric Sauzéat

Thursday, December 17th 2020

- 9:00 – 12:00 RILEM TC 279-WMR workshop**
Organisers: Lily Poulikakos, Emiliano Pasquini
- 12:00 – 13:30 Lunch**
- 13:30 – 16:30 RILEM TC 264-RAP workshop**
Organisers: Gabriele Tebaldi, Eshan Dave

Information on Zoom connection links are provided by the organisers to registered participants.



Poster list

Selected 12 posters for Poster Sessions

- M. Aurilio, H. Baaj, *Examining the effects of a self-healing elastomer on the properties of bitumen*
- C. Brondani, C. Faccin, K. W. Kraemer, F. D. Boeira, L. Pivoto Specht, A. V. Nummer, *Asphalt aggregate adhesion: Study of the influence of the morphological, chemical and mineralogical properties of different aggregates from southern Brazil*
- O. Eman, Y. Zhang, *Multiphysics simulation and validation of field ageing of asphalt pavements*
- A. Forton, S. Mangiafico, C. Sauzéat, H. Di Benedetto, P. Marc, *Estimation of complex shear modulus of binder blends produced with RAP binder and rejuvenator*
- R. Freire, H. Di Benedetto, C. Sauzéat, S. Pouget, D. Lesueur, *Effect of fiberglass geogrid reinforcement to fatigue resistance of bituminous mixtures*
- G. Giancontieri, S. Pouget, D. Lo Presti, *Improved testing setup for real-time monitoring of PMBs during manufacturing and rotational viscosity measurements*
- D. Grossegger, A. Garcia, G. Airey, *Crack Self-Healing in Asphalt as a Flow Process*
- B. Pouteau, A. Martin, K. Berrada, J.-A. Decamps, P. Diez, *Impact of the performance of the asphalt concrete and the geogrid materials on the fatigue of geogrid-reinforced asphalt concrete – experimental study*
- F. Preti, B. Chagas Silva Gouveia, E. Romeo, G. Tebaldi, E. V. Dave, J. E. Sias, *Elasto-plastic model for bitumen stabilized materials using triaxial testing and finite element modelling*
- D. Ramirez Cardona, H. Di Benedetto, C. Sauzeat, N. Calon, *Fatigue and moisture damage resistance of bituminous mixtures for railway trackbeds*
- N. Viscione, F. Russo, R. Veropalumbo, C. Oreto, *Assessing geometric features impact of laboratory specimens on ITS variation*
- D. Vizzari, E. Genesseeux, S. Lavaud, S. Bouron, E. Chailleux, *Surface dressing treatment for applications on solar roads*

Other posters

- Q. Adam, G. Englmaier, E. Levenberg, A. Skar, *Active Mitigation of Low-Temperature Cracking in Asphalt Pavements*
- S. Amani, A. Kavussi, M. M. Karimi, *Application of activated carbon on induction heating-induced healing characteristics of aged mixes*
- V. Antunes, J. Neves, A. C. Freire, *Mechanical assessment of recycled bituminous mixtures*
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Plenary session 2: RILEM TC 278-CHA – **Hassan Baaj**

Plenary session 3: RILEM TC 264-RAP – **Gabriele Tebaldi**

Parallel session 1.1.A: Binder/Sealing – **Ferhat Hammoum**

Parallel session 1.1.B: Healing 1 – **Laurent Porot**

Parallel session 1.1.C: Modelling 1 – **Ramon Botella**

Parallel session 1.2.A: Binder 1 – **Orazio Baglieri**

Parallel session 1.2.B: Fatigue of bituminous mixtures – **Andrea Graziani**

Parallel session 1.2.C: Crumb rubber recycling – **Davide Lo Presti**

Parallel session 1.3.A: Emulsions – **Gordon Airey**

Parallel session 1.3.B: Healing 2 – **Eshan Dave**

Parallel session 1.3.C: Recycling 1 – **Jo Sias**

Parallel session 2.1.A: Binder modification – **Greet Leegwater**

Parallel session 2.1.B: Mixtures and low temperatures 1 – **Christophe Petit**

Parallel session 2.1.C: Aging 1 – **Lily Poulikakos**

Parallel session 2.2.A: Bio-binders – **Fernando Moreno-Navarro**

Parallel session 2.2.B: Mixtures and low temperatures 2 – **Manfred Partl**

Parallel session 2.2.C: Aging 2 – **María del Carmen Rubio-Gámez**

Parallel session 2.3.A: Cold recycling – **Alan Carter**

Parallel session 2.3.B: Pavement properties 1 – **Daniel Perraton**

Parallel session 2.3.C: Aging 3 – **Denis Jelagin**

Parallel session 3.1.A: Recycling 2 – **Emiliano Pasquini, Cesare Sangiorgi**

Parallel session 3.1.B: Viscoelasticity and permanent deformation of bituminous materials 1 – **Paul Marsac**

Parallel session 3.1.C: Pavement properties 2 – **Andreas Loizos**

Parallel session 3.2.A: Rejuvenators in bituminous materials – **Bernhard Hofko**

Parallel session 3.2.B: Viscoelasticity and permanent deformation of bituminous materials 2 – **Francesco Canestrari**

Parallel session 3.2.C: Miscellaneous – **Christiane Raab**

Parallel session 3.3.A: Recycling 3 – **Kamilla Vasconcelos**

Parallel session 3.3.B: Cracking of bituminous mixtures – **Michael Wistuba**

Parallel session 3.3.C: Modelling 2 – **Imad Al-Qadi**

Poster sessions 1 and 2 – **William G. Buttlar**



RILEM TC 279-WMR Workshop

Valorisation of Waste and Secondary Materials for Roads

Thursday, December 17th 2020 - 9:00-12:00

Organisers:

Dr. Lily Poulikakos, EMPA, Switzerland (Chair of RILEM TC 279-WMR)

Prof. Emiliano Pasquini, Università di Padova, Italy (Deputy Chair of RILEM TC 279-WMR)

It is well established that currently a considerable amount of waste is produced and a major part of the resources are wasted through the mainly linear process of material use in our economies. Various types of waste materials such as crumb rubber, plastics and construction & demolition waste have been successfully used in road pavements.

RILEM TC 279-WMR aims to develop and broadly demonstrate such solutions in order to promote widespread market uptake. This workshop will bring together all stakeholders including those working within the TC in order to address all aspects pertaining to the use of waste and marginal materials in roads.

This spans from choice of waste and marginal materials, laboratory characterization, in situ performance and standardization.

Registration for the RILEM TC 279-WMR Workshop is free but mandatory for participation: <https://forms.gle/wHMSBLmW5PndExiu9> (if you already registered for the workshop through ISBM Lyon 2020 you need not re-register)

Agenda

- 9:00 – 9:10 Overview of RILEM TC 279-WMR (Lily Poulikakos, EMPA, and Emiliano Pasquini, U Padova)
- 9:10 – 9:25 TG1 waste plastic modified asphalt binders (Marian Tusar, ZAG)
- 9:25 – 9:45 Suitability of conventional test methods for heterogeneous materials (Davide Lo Presti and Gaspare Giancontieri, U Palermo)
- 9:45 – 10:05 Standardisation and implementation requirements for asphalt with waste plastic (Konrad Mollenhauer, U Kassel)
- 10:05 – 10:20 TG2 crumb rubber modified asphalt binders (Jorge Pais, U Minho)
- 10:20 – 10:40 Fatigue performances of mixes containing Reacted and Activated Rubber (Jorge Sousa, CONSULPAV)
- 10:40 – 10:55 TG3 waste aggregates in asphalt mixture (Emiliano Pasquini, U Padova, Augusto Cannone Falchetto, U Alaska Fairbanks, Fernando Moreno, U Granada)

-
- 10:55 – 11:15 Use of recycled aggregate from construction and demolition waste for stabilized pavement subbases (Marco Bassani, Politecnico Torino)
 - 11:15 – 11:30 TG4 environmental risk assessment (Oumaya Marzouk, CEREMA, Gaetano Di Mino, U Palermo)
 - 11:30 – 11:45 TG5 life cycle assesement assessment (Davide Lo Presti, U Palermo, Ana Jimenez del Barco Carrion, U Granada)
 - 11:45 – 12:00 Summary and closing (Lily Poulikakos, EMPA, Emiliano Pasquini, U Padova)

4th RILEM TC 264-RAP Industry Workshop Asphalt Pavement Recycling

Thursday, December 17th 2020 - 13:30-16:30

Organisers:

Prof. Gabriele Tebaldi, Università di Parma, Italy (Chair of RILEM TC 264-RAP)

Prof. Eshan Dave, University of New Hampshire, USA (Deputy Chair of RILEM TC 264-RAP)

This workshop is expected to be a meeting point for discussions among academia, industries and agencies to exchange ideas and transfer of knowledge and expertise. The workshop will be focused on the different aspects of recycling of asphalt pavements from the point of view of agencies, pavement constructors and equipment manufacturers. A major objective of this workshop is to have an open exchange between researchers and practitioners to gather information on open problems that have to be tackled in coming years to successfully recycle asphalt pavements. A series of speakers will make presentations to define the problems and present innovative solutions to these problems. The idea is to explore both technical and practical aspects of the different asphalt recycling techniques topic ranging from specifications, equipment, life cycle assessment and the environmental aspects.

Registration for the RILEM TC 279-WMR Workshop is free but mandatory for participation: <https://forms.gle/jq1BBkmzKJRiU1wd8> (if you already registered for the workshop through ISBM Lyon 2020 you need not re-register).

Agenda

- 13:30 – 13:45 Introduction to RILEM TC 264-RAP (Gabriele Tebaldi, Chair of TC 264-RAP)
- 13:45 – 14:30 Presentations on **Cold Recycling** o Speakers: Alan Carter (TG-1 Leader, ÉTS Montreal) and Xavier Carbonneau (Colas)
- 14:30 – 15:15 Presentations on **Hot and Warm Recycling** o Speakers: Paul Marsac (TG-2 Leader, U. Eiffel), Julien Van Rompu and Julien Waligora (Eiffage)
- 15:15 – 16:00 Presentations on **Recycling Agents** o Speakers: Martin Hugener (TG-3 Leader, EMPA), David Mensching and Michael Elwardany (FHWA)
- 16:00 – 16:30 Open Discussions moderated by Gabriele Tebaldi

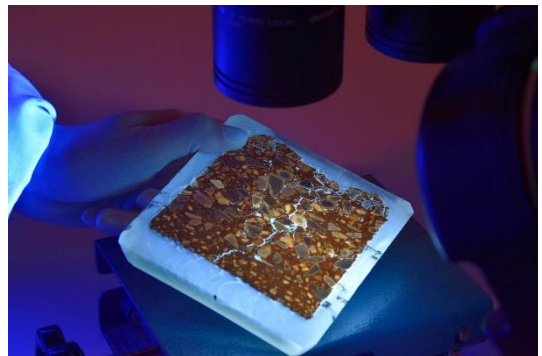


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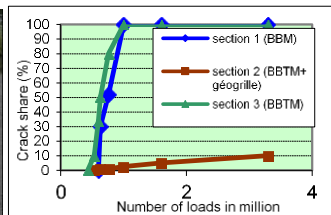
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