



Programme

Universidad Politécnica de Madrid / Technical University Madrid

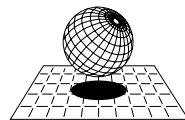
**Second International Conference on
Concrete Sustainability - ICCS16**

PROGRAMME

**13 – 15 June 2016
Madrid, Spain**

A publication of:

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Methods in Engineering (CIMNE)**
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Spain

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INTRODUCTION

On behalf of the Organising Committee of the Second International Conference on Concrete Sustainability (ICCS 16), it is our pleasure to welcome you to Madrid and the conference on concrete sustainability.

Thank you for attending ICCS16, which is organised by the Technical University of Madrid and co-organised by the Spanish Association for Structural Concrete (ACHE), the American Concrete Institute (ACI), the Latin American Association for Pathology of Constructions (ALCONPAT), the International Federation for Structural Concrete (fib), the Japan Concrete Institute (JCI), and the International Union of Laboratories and Experts in Construction Materials (RILEM).

The First International Conference on Concrete Sustainability, ICCS13, took place in Tokyo, May 2013 where more than 200 people from 36 countries registered. It was a success in both scientific output and attendance. The high level of the presented papers showed that sustainability is already a key aspect for construction and, in particular, in construction with concrete. In the future, it will become an even more significant aspect in construction, such as planning, design, execution, maintenance and dismantling. Many research and normative aspects have still to be developed. We hope that the ICCS16 will contribute to improving the construction with concrete in this way.

We really appreciate the enthusiastic effort and confidence coming from Prof. Koji Sakai, Chair of the ICCS Steering Board and founder of ICCS. He has provided a forum in which people from around the world come together to share their ideas and to discuss sustainability issues related to the concrete and construction industries. In addition, we also appreciate his support in the organisation of ICCS16 in Madrid. He has been always ready to help.

We would like to thank the Steering Board of ICCS for the invitation to organise the ICCS16 in Madrid. We also show our gratitude for the financial support provided by SIKA SAU (Platinum Sponsor) and MAPEI (Gold Sponsor). The work of the International Scientific Committee is sincerely appreciated. In addition, we would like to express our gratitude to all the authors for their valuable contributions, and to all the participants for their interest in the Conference.

We hope that all participants enjoy ICCS16 and that they have a fruitful stay in Madrid.

The Local Steering Committee



Jaime C. Gálvez

*Technical University
Madrid, Spain*



David Fernández-Ordóñez

*International Federation
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Antonio Aguado

*Technical University
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ICCS Chairman's Welcome



On behalf of the Steering Board of the International Conference on Concrete Sustainability (ICCS), I would like to welcome you to ICCS16 in Madrid. The ICCS was founded in Tokyo in 2013, to provide a forum in which people from around the world come together to share their ideas and to discuss sustainability issues related to the concrete and construction industries. Many excellent papers were presented and based on this, we are confident that we will be able to

change our current traditional systems and technologies into new ones from the point of view of sustainability through further comprehensive research activities.

I would like to thank the ICCS Local Organizing Committee and the Technical University of Madrid for their preparation for and dedication to ICCS16. The conference could not have been realized without their great efforts. I also would like to express my appreciation to all paper authors for their contribution in providing the invaluable outcomes of their research, which have great potential in making our society more sustainable. In addition, all participants are greatly appreciated for their interest in this conference.

I have been involved in developing ISO 13315 standards for environmental management for concrete and concrete structures as its chairman since its foundation in 2007. The standards will provide you with a common rule to evaluate environmental impacts and benefits. I really hope that you will use them in your research and that you will be able to introduce more sophisticated and significant results in your work on the performance of concrete and concrete structures based on the idea of sustainability. I believe that innovative systems and technologies in the concrete and construction industries can be developed from their application.

The COP 21 meeting was held in 2015, where the Paris Agreement was adopted to reduce greenhouse gas emissions from human activity to keep global warming below 2°C. The target is very high considering the current world situation. The concrete and construction industries have a great responsibility concerning CO₂ emissions. Sustainability covers social aspects including the safety of structures. We in Japan experienced the catastrophic Great East Japan Earthquake in 2011 and Kumamoto Earthquake in 2016. In addition, there was the Ecuador earthquake in 2016 in which many people were killed and injured. Based on these facts, we really need to consider the essence of the safety design of structures from the viewpoint of sustainability in society. We need to develop a comprehensive way to incorporate "sustainability" into our design system. It is my hope that we will extend our ideas in such a direction through discussions at ICCS conferences.

I hope that all participants will enjoy ICCS16 and explore not only Madrid, but also Spain which has such a great history.

堺 亨司

Koji Sakai

ORGANIZERS AND COMMITTEES

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CIMNE Congress Bureau

Campus Nord UPC

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PLENARY LECTURERS



Antonio Aguado

Universitat Politècnica de Catalunya - BarcelonaTech (UPC)
CEO Smart Engineering, Barcelona, Spain

Sustainability evaluation of the concrete structures



Harald S. Müller

President of fib
Institute of Concrete Structures and Building Materials,
Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

Design and properties of sustainable structural concretes



Michael J. Schneider

President (2016-2017), American Concrete Institute
Senior Vice President, Baker Concrete Construction, USA

Expanding knowledge and resources for modern concrete professionals: innovation, sustainability, and resilience



Johan Vyncke

President of RILEM
Director Research & Innovation
Belgian Building Research Institute – BBRI

Recycling of construction and demolition waste an overview of RILEM achievements and state of the art in the EU

TECHNICAL SESSIONS

Case Studies

Construction Aspects

Durability

Environmental Design

Materials

Lead Papers

Case studies

Sustainability of bridge structures. Indicator system
R. Valdivieso, J.R Sánchez Lavín and D. Fernández-Ordóñez

Construction aspects

Automatic design of building construction processes by simulated annealing. A measure to improve sustainability, time, financial and computational costs.
M. Buitrago, J.M. Adam, P.A. Calderón and J.J. Moragues

Fabrication, performance and environmental safety of fired bricks from lake silt and sewage sludge
Y.M. Zhang, L.T. Jia, H. Mei, P. Zhang, Q. Cui, P.G. Zhang and Z.M. Sun

Shotcrete reinforced with recycled fibers from secondary waste of end of life tires
S. Serna, P. Serna, M.J. Pelufo, V. Orero and A. Llano

Durability

Alkali-silica resistance of coal bottom ash mortars
C. Argiz, E. Menéndez and A. Moragues

Concrete cracking in marine micro-climates
P. Castro-Borges, A. A. Torres-Acosta, M. G. Balancán-Zapata and J. A. Cabrera-Madrid

Corrosion crack pattern at early ages due to pressure rust layer in reinforced concrete
D. Galé, A.M. Bazán, J. C. Gálvez and E. Reyes

Durability of sustainable ternary blended concrete containing blast furnace slag and limestone filler
Á. Fernández, M.C. Alonso, J.L. García Calvo and M. Sánchez

Effect of phase change material on temperature shifting in concrete panels
P. Sukontasukkul, P. Chindapasirt, D. Choi and K. Sakai

Replacement of steel with GFRP as internal reinforcement for corrosion-free reinforced concrete structures
S. Sheikh, Z. Kharal and A. Tavassoli

Seeking a more sustainable structural concrete by using a combination of polyolefin-based fibres and steel fibres
M.G. Alberti, A. Enfedaque and J.C. Gálvez

The damage of calcium sulfoaluminate (CSA) cement paste partially immersed in Na_2CO_3 solution
Z. Liu, L. Hou, D. Deng and G. De Schutter

The paradox of high performance concrete used for reducing environmental impact and sustainability increase
J. Pacheco, L. Doniak, M. Carvalho and P. Helene

Environmental design

New route to synthesize biobased PCE superplasticizer

J. Zimmermann and C. Fiuza

A study on an indicator for environmental impacts of cement industry

K. Kawai, S. Hoshino, H. Hirao and S. Tanaka

Can a general structural code for both new and existing concrete structures enhance the way we approach sustainability for existing structures?

S. L. Matthews and G. Mancini

Engineering the way for sustainability

G. L. Balázs, S. G. Nehme, R. Nemes, A. Ceh and K. Kopecko

Green concrete specification and environmental declarations of concrete

D. Choi, C.-U. Chae and M.-K. Lim

Overview of resource conservation and closed-loop recycling in concrete toward sustainability

T. Noguchi

Resiliency: the key to a sustainable future

J.K. Buffenbarger

Sustainability of concrete structures in changing world

P. Hajek

Swedish view of concrete and sustainability

J. Silfwerbrand

Materials

Can artificial recycled fine aggregate truly represent fine aggregated from C&DW

A. Katz and D. Kulisch

Future cements: research needs for sustainability and potential of LC3 technology

K. Scrivener

Influence of temperature on the rheology of pastes and selfcompacting mortars with sustainable binders

A. Pacios, A. Köening and F. Dehn

Sustainability applied to prefabrication

D. Fernández-Ordóñez and A. de la Fuente

Sustainability assessment of concrete with recycled concrete aggregates

D. Garcia, A. Lisbona, J.S. Dolado, I. Vegas, J. San Jose, J. Sanchez and V. Garcia

CONFERENCE INFORMATION

Reception and accreditation

In the access of the Conference Hall, a booth will be placed to handle registration for the conference. General information will be supplied to the attendees together with the congress documentation and registry credentials. The attendees will be required to register with the appropriate credentials and will receive in the documentation the vouchers for the meals and banquet. Late registration will be managed by the personnel of the local organization.

The registration pack includes the book of proceedings that contains the abstracts of the presentations, a digital copy with the full papers and the congress programme.

The booth for initial registration that will be opened from 8:30 of 13 June up to the end of the Plenary Lectures at 12:30. The main secretariat will be moved to the lecturer theatre (located in Room 31, Aula 31), where late registrations will be managed.

Organization of the sessions

The opening ceremony, plenary lectures and closing ceremony will be held in the Conference Hall of the Civil Engineering School, located on the ground floor of the building next to the main entrance. The rest of the conferences will take place in three specially-equipped parallel rooms located on the first floor.

At the end of the first day sessions, a welcome concert will be offered by the Choir of the Technical University of Madrid. This will take place in the Conference Hall.

Further changes that affect the program or the Congress will be announced in order.

Presentation and instructions for authors

The oral presentations will be accepted in PowerPoint, pdf or any other format compatible with Windows. The speakers should load the presentation files onto the computers placed in the Room 31 (Aula 31) located on the first floor, following the instructions of an assistant that will help them and check that the file loads and works.

This procedure will be accepted until two hours before the beginning of the corresponding session. In order to clarify certain details and enable the conference to be as successful as possible, 15 minutes before the starting time of the session, the Chairman and the Co-chairman will meet the speakers in the same room where the presentations will be made.

The lecturers will present their works by following the sequence previously set and will be required to respect the assigned time to the full.

Each regular presentation is allotted 15 minutes (12 minutes speech and 3 minutes for questions). Lead-papers presentations are allotted 20 minutes (15 minutes speech and 5 minutes for questions).

Internet Access

WIFI: InvitadosUPM

User: iccs.16@invitadosupm

Password: iccs16

Congress location

The Congress will be held at *Escuela de Ingenieros de Caminos, Canales y Puertos of Universidad Politécnica de Madrid* (Civil Engineering School of the Technical University of Madrid). The School is located in the centre of the city in the so-called district of Ciudad Universitaria.



ADDRESS

Escuela de Caminos, Canales y Puertos
Profesor Aranguren Street (without number)
28040 Madrid
Website:
<http://www.caminos.upm.es/default.asp>

How to get there

Means of access and helpful notes

By car:

- Free parking is available at the School

Public transport:

- Metro: Line 6, alight at Ciudad Universitaria Station (Metro website: <https://www.metromadrid.es/es/index.html>)
- Bus: Line G, from Moncloa metro station
- Bus: Line F, from Cuatro Caminos metro station

From the airport - Route suggested by Metro:

- The Aeropuerto T1, T2 T3 or Aeropuerto T4 stations are located on Line 8 (coloured pink with destination Nuevos Ministerios).
- Transfer at Nuevos Ministerios to Line 6 (coloured grey, this is a circular line)
- Estimated time: 35 minutes

Taxi service:

Please check the flat fares for/to the airport and taxi services at the website: <http://www.aeropuertomadrid-barajas.com/transportation/madrid-airport-bytaxi.htm>

For further information visit the website: <http://www.caminos.upm.es/principal.php?contenido=/Escuela/01-Localizacion.html&mp=1&ml=0>



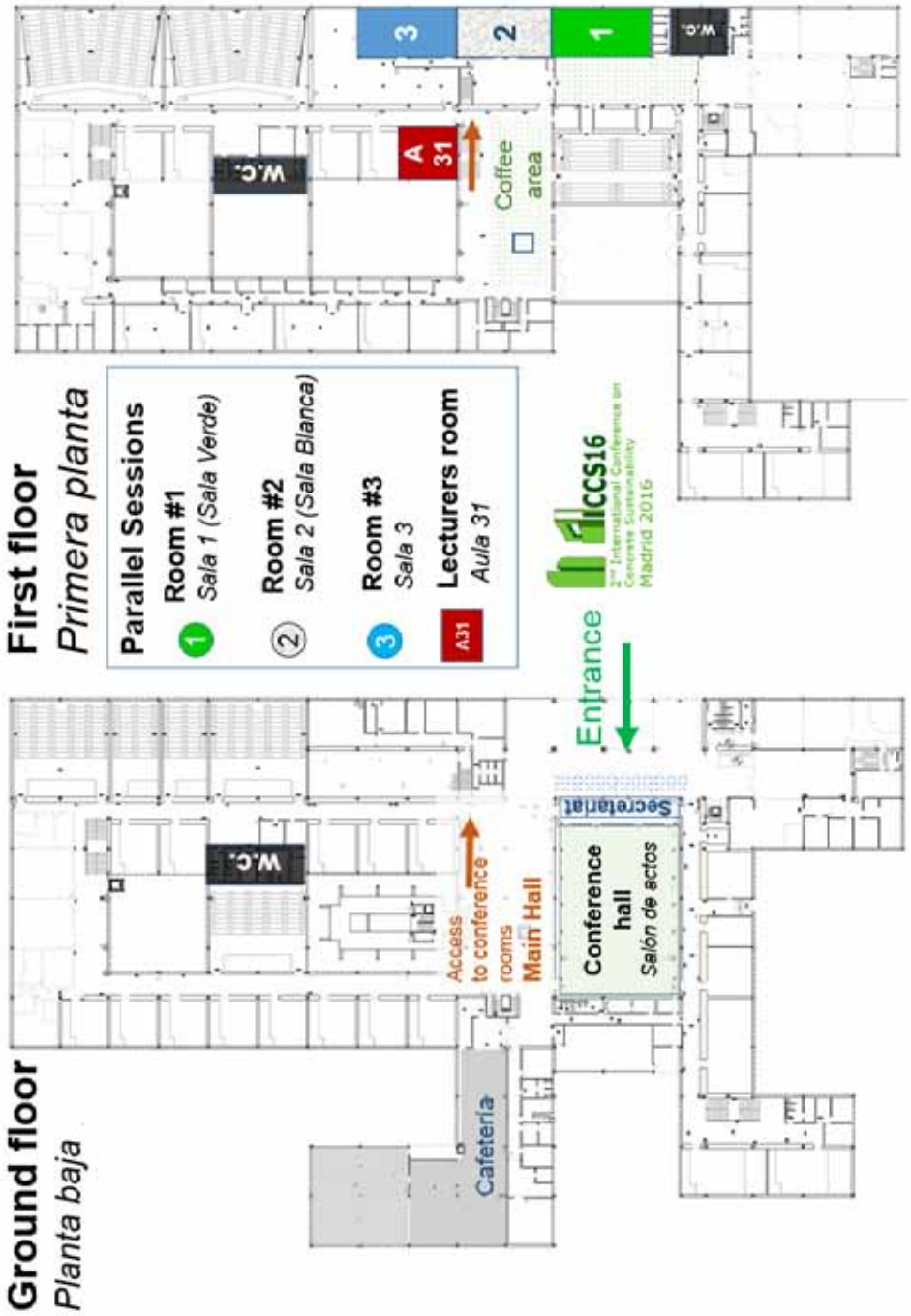
Social programme

Social Events are the Welcome Concert and the Banquet Dinner. Participation in these events is included in the registration fees.

The Welcome Concert will take place in the evening of Monday 13 June, at the Conference Hall of the *Escuela de Ingenieros de Caminos, Canales y Puertos* of *Universidad Politécnica de Madrid*.

The Conference Banquet will be held in the evening of Tuesday 14 June, at the Restaurant "El Jardín de Somontes" located in the middle of the Park Monte de El Pardo. Transfer by bus from the main venue of the Conference to the Banquet venue is included in the fee.

Rooms Location



1

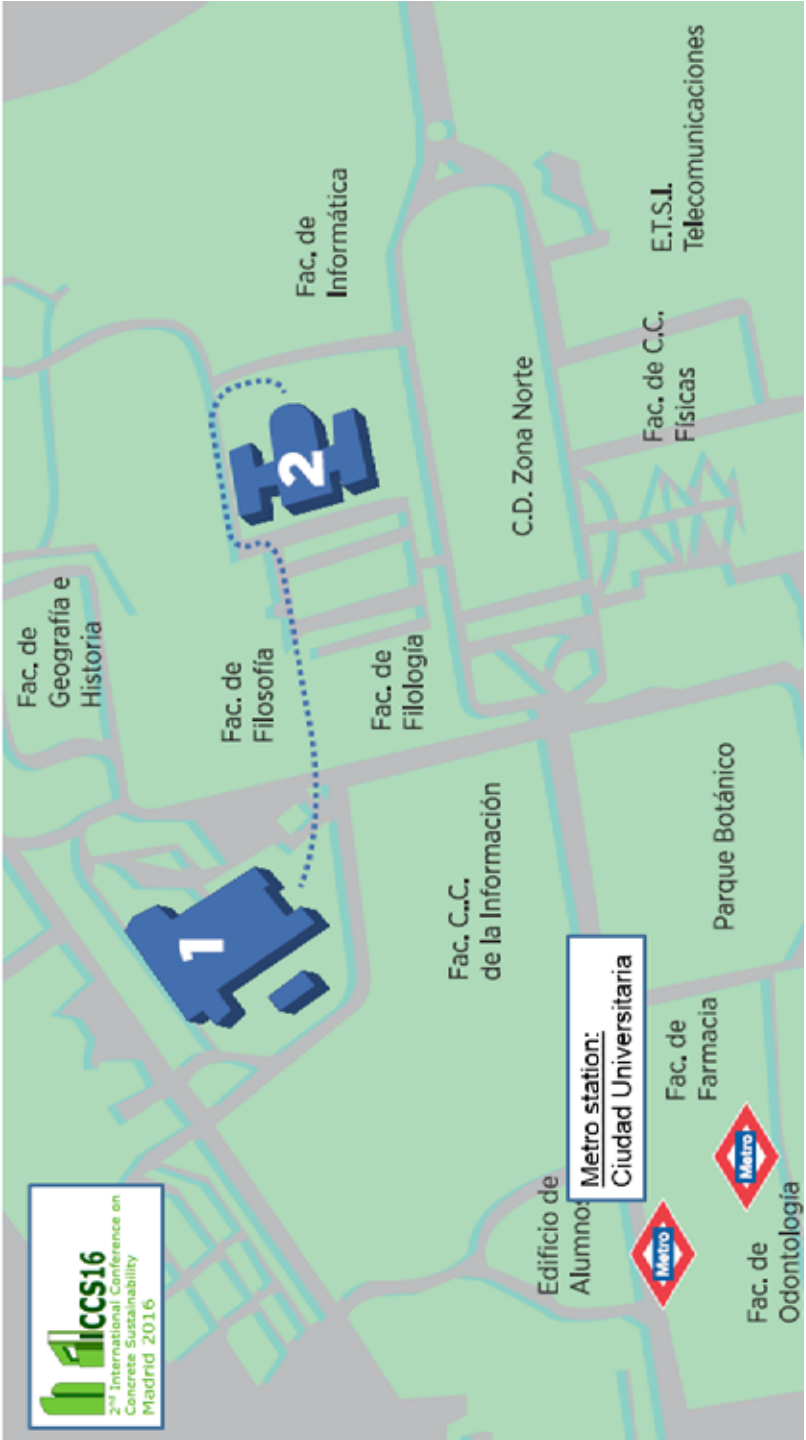
Conference location:

ETS Ingenieros de Caminos, Canales y Puertos,
School of Civil Engineers,
Universidad Politécnica de Madrid

2

Restaurant location:

Facultad de Derecho
Law School
Universidad Complutense de Madrid



Technical Session Overview

Technical sessions-Overview												
MONDAY 13 JUNE				TUESDAY 14 JUNE				WEDNESDAY 15 JUNE				
Schedule	1	2	3	1	2	3	1	2	3	1	2	3
9:00-10:30	8:30-9:30 9:30-10:00 10:00-10:30 10:30-11:00	Registration Opening Ceremony Plenary Lecture 1 Plenary Lecture 2										
	11:00-11:30	Coffee break										
11:00-12:30	11:30-12:00 12:00-12:30	Plenary Lecture 3 Plenary Lecture 4										
12:30-13:30	Materials M1	Materials M2		Materials M3	Materials M4	Construction aspects C2	Durability D7	Materials M9	Durability D8	Durability D9	Construction aspects C3	Materials M10
	Lunch			Lunch			Lunch			Lunch		
15:00-16:30	Durability D1	Construction aspects C1	Environmental design E1	Durability D5	Case studies Cs3	Environmental design E3	Materials M11	Construction aspects C4	Durability D11			
	Coffee break			Coffee break			Coffee break			Coffee break		
17:00-18:30	Durability D2	Materials M3	Case studies Cs1	Environmental design E4	Materials M8	Durability D6						
19:30-20:30	Concert <i>Chorus of the Technical University Madrid Conference Hall</i>		20:00	Group Photo & Bus Departure to Conference Dinner <i>Main Door of the Civil Engineering School of the Technical University of Madrid</i>			CLOSING CEREMONY					
	Snack Spanish Wine		20:30-22:30	Conference Dinner <i>El Jardín de Somorites</i>								

DETAILED TECHNICAL PROGRAMME

Monday, June 13

08:30 - 09:30	REGISTRATION
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09:30 - 10:00	OPENING CEREMONY
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10:00 - 11:00	PLENARY LECTURES	Room: Conference Hall Chairs: Hugo Corres Peiretti and Jaime C. Galvez
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Environmental impact, performance and service lifetime - pillars of sustainable concrete construction

H. S. Müller, M. Haist, J. S. Moffatt and M. Vogel

Expanding knowledge and resources for modern concrete professionals: innovation, sustainability, and resilience

M.J. Schneider

11:00 - 11:30	COFFEE BREAK
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11:30 - 12:30	PLENARY LECTURES	Room: Conference Hall Chairs: Koji Sakai and David Fernández-Ordóñez
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Recycling of construction and demolition waste an overview of RILEM achievements and state of the art in the EU

J. Vyncke and J. Vrijders

Sustainability evaluation of the concrete structures

A. Aguado de Cea, J.C. Gálvez, D. Fernández-Ordóñez and A. de la Fuente

12:30 - 13:30	TECHNICAL SESSIONS
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MATERIALS I - M1	Room: 1 Chairs: Petr Hajek Co-Chair: Akio Kasuga
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LEAD PAPER - Sustainability applied to prefabrication

D. Fernández-Ordóñez and A. de la Fuente

Sustainability assessment of different reinforcement alternatives for precast concrete segmental linings

A. de la Fuente, A. Blanco, S. Cavalaro and A. Aguado de Cea

Assessing the sustainability of precast concrete towers for wind turbines

A. de la Fuente, C. Gómez del Pulgar, F. Pardo and A. Aguado de Cea

A first approach: towards sustainable civil engineering works using precast concrete solutions

A. López and V. Yepes

CO₂ and H₂O diffusion of water- and clinker-reduced concretes

S. Steiner, A.L. Müller and T. Proske

MATERIALS II - M2

Room: 2
Chair: Miguel Angel Sanjuán
Co-Chair: Johan Silfwerbrand

Impact of aluminates on silicates hydration

E. Pustovgar, J. B. d'Espinose de Lacaillerie, M. Palacios, A. Andreev, R. K. Mishra and R. J. Flatt

The effect of particle size distribution on early age chemical shrinkage of cement pastes
X. Gaviria and J.I. Tobon

Effects of pozzolanic addition and fibre treatment on mechanical performance of cement based composites reinforced with cellulose fibre nonwovens
J. Claramunt, L.J. Fernández-Carrasco and M. Ardanuy

Material properties of mineralized foam and its density dependency – a meta-study
A. Gilka-Bötzow, M. Zimmer and E. A. B. Koenders

Effects of phase change material on hydration heat of fly ash and blast-furnace slag concrete
S.J Jang, G.Y Jeong and H.D. Yun

13:30 - 15:00

LUNCH BREAK

15:00 - 16:30

TECHNICAL SESSIONS

DURABILITY I - D1

Room: 1
Chair: Shamim Sheikh
Co-Chair: Fernando Ortiz Quintana

LEAD PAPER - Corrosion crack pattern at early ages due to pressure rust layer in reinforced concrete

D. Galé, A.M. Bazán, J.C. Gálvez and E. Reyes

Corrosion protection evaluation of galvanized steel reinforced concrete for service life extension in chloride aggressive environments

F.J. Luna Molina, M.C. Alonso Alonso, R. Jarabo Centenero, M. Sánchez Moreno and E. Hernández Montes

Efficiency of chloride extraction from reinforced concrete with intermittent applications
H. Nguyen Thi, H. Yokota and K. Hashimoto

Influence of high temperature history on chloride penetration of concrete using waste-derived aggregate

Y. Ogawa, A. Fujiyama, R. Sato, K. Kawai and H. Ooishi

Changes in chloride penetration properties caused by reaction between sulfate ions and cement hydrates

Y. Kato, S. Naomachi and E. Kato

CONSTRUCTION ASPECTS I - C1

Room: 2
Chair: Antonia Pacios
Co-Chair: Mikael Braestrup

LEAD PAPER - Automatic design of building construction processes by simulated annealing. A measure to improve sustainability, time, financial and computational costs
M. Buitrago, J.M. Adam, P.A. Calderón and J.J. Moragues

Cement based façades for mid-rise commercial sustainable and resilient buildings
G. Barluenga, O. Ladipo, G. Reichard and R.T. Leon

Sustainable TBM tunnels for tomorrow
S. Pompeu-Santos

Life cycle assessment of protective coatings for concrete
M. Donadio, A. Carmona, A. Tebar and C. Fiuza

Retrofitting with an IAB concept: a sustainable solution
M. Muñoz, F. Ariñez Fernández, R. Yadav, M. Iuliano and B. Briseghella

Sustainability features of an elevated road corridor under construction in an urban environment

S. Bansal and S K Singh

ENVIRONMENTAL DESIGN I - E1

Room: 3
Chair: Amnon Katz
Co-Chair: Alejandro López Vidal

LEAD PAPER - Engineering the way for sustainability
G. L. Balázs, S. G. Nehme, R. Nemes, A. Ceh and K. Kopecsko

Lessons learned from implementing the North American precast concrete sustainable plant program
E. Lorenz and D. Frank

Sustainability assessment of Indian blended cements in terms of energy and resource consumption
A. Patel, K. Nagrath, S. Prakasan, R. Gettu, S. Palaniappan and S. Maity

Life cycle assessment of reinforced concrete beams designed according to the MC 2010 and the Spanish EHE – 08 standard
P. Pujadas, A. de la Fuente and C. Almirall

Design for safety in construction work
M. Casanovas-Rubio, J. Armengou and G. Ramos

16:30 - 17:00 COFFE BREAK

17:00 - 18:30 TECHNICAL SESSIONS

DURABILITY II - D2

Room: 1
Chair: Carmen Andrade
Co-Chair: Yoshitaka Kato

LEAD PAPER - Replacement of steel with GFRP as internal reinforcement for corrosion-free reinforced concrete structures
S. Sheikh, Z. Kharal and A. Tavassoli

Mechanical properties and chloride ions penetration of concretes containing nanosilica and rice husk ash
A.A. Ramezaniapour, M. Zahedi and A. M. Ramezaniapour

Preventing reinforcement corrosion in cracked concrete by self-repair
K. Van Tittelboom, B. Van Belleghem, J. Dhaene, L. Van Hoorebeke and N. De Belie

Influence of electric conduction of steel bars on electrochemical measurement of reinforced concrete structure
N. Someya, Y. Kato and E. Kato

Chloride diffusion in alkali activated concrete
O.O. Ojedokun and P.S. Mangat

MATERIALS III - M3

Room: 2
Chair: Karen Scrivener
Co-Chair: Nader Ghafoori

Mechanical properties of fiber reinforced cementitious composites with high amounts of fly ash as cement replacement
A. V. Georgiou and S. J. Pantazopoulou

Strength properties and eco-efficiency of low carbon strain-hardening cement composite (SHCC)
S.W. Kim, H.D. Yun, W.S. Park, Y.I. Jang, S.W. Kim, J.W. Lee and Y.I. Nam

Study of mechanical properties of high performance concrete with addition of stabilized nanosilica
P. Nollí Filho, A. Gumieri, J. Calixto, C. Silva and A. Quiñones

Valorization of a waste into cementitious material: dredged sediment for production of self compacting concrete
F. Rozas, A. Castillo, I. Martínez and M. Castellote

Properties of self consolidating concrete containing Natural Pozzolan
N. Ghafoori, M. Sharbat and M. Najimi

CASE STUDIES I - Cs1

Room: 3
Chair: Julie Buffenbarger
Co-Chair: Raul Alonso-Calvo

Contributing to sustainability of concrete by using steel fibres from recycled tyres in water retaining structures

A. Pérez Caldentey, J. Giménez Vila, J.M. Ortolano González, F. Rodríguez García and G. Grolí

Carbonation and recycling potential of novel MgO cements

C. Unluer

Study of concrete modification effect with recycled aggregate treated by carbonation

T. Iyoda and N. Matsuda

Self-healing performance of magnesia-based pellets in concrete

R. Alghamri and A. Al-Tabbaa

Bond-Slip behaviours between deformed steel bar and 100% Recycled Coarse Aggregate (RCA) concrete using pull-out and beam tests

H.D. Yun, S.J Jang, S.W. Kim and W.S. Park

19:30 - 20:30

WELCOME CONCERT & SNACK SPANISH WINE

Chorus of the Technical University of Madrid, Conference Hall

Tuesday, June 14

09:00 - 10:30

TECHNICAL SESSIONS

MATERIALS IV - M4

Room: 1
Chair: Fernando Martínez Abella
Co-Chair: Takeshi Iyoda

LEAD PAPER - Sustainability assessment of concrete with recycled concrete aggregates
D. García, A. Lisbona, J.S. Dolado, I. Vegas, J. San José, J. Sánchez and V. García

Self-compacting concrete made with recovery filler from hot-mix asphalt plants: mechanical properties

A. Romero-Esquinas, J.M. Fernández and J.R. Jiménez

Sulphate resistance of concrete containing recycled granulated steel as a partial replacement of fine aggregate

U. M. T. Quadir, K. Islam, A. H. M. M. Billah and M. S. Alam

Economical effect on ultra-high performance concrete by using of coarse aggregates

M. Schneider, S. Ofner, T. Steiner and P. Druml

A study into the relationships between the mechanical properties of recycled aggregate concrete

N. Khalil, A. Touma, T. Touma and R. Daher

DURABILITY III - D3

Room: 2
Chair: Pedro Castro Borges
Co-Chair: Amparo Moragues

LEAD PAPER - The paradox of high performance concrete used for reducing environmental impact and sustainability increase

J. Pacheco, L. Doniak, M. Carvalho and P. Helene

Influence of carbonation on the chloride ion diffusion coefficient in fly ash concrete

R. Malheiro, A. Camões, G. Meira, R. Ferreira, M. Amorim and R. Reis

Calcium hydroxide curing for accelerated carbonation testing of high volume fly ash cementitious blends

R. Reis, A. Camões, M. Ribeiro and R. Malheiro

First approach to thermochromic mortars: compatibility between thermochromic pigments and cement

G. Perez, A. Guerrero and A. Pons

Changes in microstructure and pore structure of low-clinker cementitious materials during early stages of carbonation

M. Bertin, O. Omikrine-Metalssi, V. Baroghel-Bouny and M. Saillio

CONSTRUCTION ASPECTS II - C2

Room: 3
Chair: Pedro Serna
Co-Chair: Martha VanGeem

LEAD PAPER - Fabrication, performance and environmental safety of fired bricks from lake silt and sewage sludge

Y.M. Zhang, L.T. Jia, H. Mei, P. Zhang, Q. Cui, P.G. Zhang and Z.M. Sun

Sustainable technology for PC grout infill

T. Matsuka, K. Sakai, S. Tanabe, R. Kudo, F. Seki and T. Urano

Durability of concrete exposed to sea water at early age: floating dock method for construction of caissons

J. Vera-Agulló, R. Lample, N. Silva, U. Müller and K. Malaga

The effectiveness of thermal mass in insulated walls in moderate climates

M. VanGeem

Reducing energy needs in residential buildings in the Spanish climate through an innovative daily storage based solution

S. Álvarez, J. A. Tenorio and R. Salmerón

10:30 - 11:00

COFFE BREAK

11:00 - 12:30

TECHNICAL SESSIONS

ENVIRONMENTAL DESIGN II - E2

Room: 1
Chair: Albert de la Fuente
Co-Chair: Masaki Tamura

LEAD PAPER - Swedish view of concrete and sustainability
J. Silfwerbrand

LEAD PAPER - Resiliency: The key to a sustainable future
J.K. Buffenbarger

Development of cementious-woodchip compound products for resilience measures in disaster situation toward sustainability
M. Tamura and K. Arakawa

Use of recycled aggregates and sea water for sustainable concrete in marine environments
M. Etxeberria and P. Pardo

DURABILITY IV - D4

Room: 2
Chair: Marco di Prisco
Co-Chair: Alejandro Enfedaque

LEAD PAPER - Seeking a more sustainable structural concrete by using a combination of polyolefin-based fibres and steel fibres
M.G. Alberti, A. Enfedaque and J.C. Gálvez

Mechanical properties of concrete reinforced with recycled steel fibers: a case study
G. Centonze, M. Leone, F. Micelli and M.A. Aiello

Study of the behavior of concrete with recycled polypropilene fibers
I. Carné and P. Serna

Eco-mechanical analysis of tyres-fiber-reinforced cement-based composites
A.P. Fantilli, R. Furnari, M. Guadagnini, B. Chiaia, K. Pilakoutas and P. Papastergiou

MATERIALS V - M5

Room: 3
Chair: Stuart Matthews
Co-Chair: Hiromi Fujiwara

LEAD PAPER - Can artificial recycled fine aggregate truly represent fine aggregated from C&DW
A. Katz and D. Kulisch

Recycled aggregate: compliance with legal requirements
C. Medina Martínez, I. F. Sáez del Bosque, A. Matías Sánchez, B. Cantero Chaparro, E. Asensio de Lucas, M. Frías Rojas and M. I. Sánchez de Rojas

Study of environmentally friendly bedding mortars prepared with recycled aggregates and biomass ash
E. Fernández Ledesma, J. Ramón Jiménez and V. Corinaldesi

Valorisation of granite chippings in the design of new cement matrices
G. Medina Martínez, I. F. Sáez del Bosque, M. Frías Rojas, M. I. Sánchez de Rojas and C. Medina Martínez

Fundamental study on the properties of mortar using Gehlenite clinker as fine aggregate
H. Fujiwara, M. Maruoka, M. Nemoto, K. Yoshikawa and M. Kobayakawa

12:30 - 13:30

TECHNICAL SESSIONS

CASE STUDIES II - Cs2

Room: 1
Chair: Donguk Choi
Co-Chair: Araceli Gálvez Moreno

Feasibility study on the utilization of alkali-treated ground municipal solid waste incineration bottom ash as cement replacement

Y. Liu and E.H. Yang

Wood-Concrete composite floor system in rehabilitation

B. Martínez Juan and R. Irlés Más

Ladle furnace slags of low and high alumina in masonry mortars

I. Vegas, T. Herrero, D. García, A. Santamaría, J.T. San-José and J.J. González

The optimization of railway concrete sleepers for increasing the durability and sustainability

Sz.A. Köllő, G. Köllő and A. Puskás

MATERIALS VI - M6

Room: 2
Chair: María del Mar Alonso
Co-Chair: Miguel Angel de la Rubia

Biomass and coal fly ash as cement replacement on mortar properties

E. Teixeira, A. Camões, F. Branco and L. Tarelho

Reuse of waste discarded by the ceramic industry as high quality components of concrete

M.J. Pelufo, N. Salomon, M. Muñoz and P. Serna

Applicability of biomass plant waste to the design of new cement based materials

J.M. Medina Martínez, I. F. Sáez del Bosque, M. Frías Rojas, M. I. Sánchez de Rojas and C. Medina Martínez

Properties of high fluidity concrete using fine powder of melt-solidified slag from municipal waste as an admixture

T. Kimura, T. Numao and K. Fukuzawa

MATERIALS VII - M7

Room: 3
Chair: Alessandro P. Fantilli
Co-Chair: Attila Puskas

Simplifications for considering the contribution of the reinforcement in the compression zone for designing more efficient RC frame elements

A. Faur and A. Puskás

Study of buckling of SMA reinforcements in concrete elements

J. Pereiro, J.L. Bonet and A. Navarro

Seismic retrofitting of concrete structures in Switzerland: repair instead of demolish. Government's approach to school buildings

F. Ortíz Quintana

Research on spray type high ductility PVA fiber concrete used for the deep roadway supporting key technology

B. Yuanzhi and G. Shumei

13:30 - 15:00

LUNCH BREAK

15:00 - 16:30		TECHNICAL SESSIONS	
DURABILITY V - D5		Room: 1 Chair: Yamei Zhang Co-Chair: Jose Vera-Agulló	
<p>Modified expanded clay lightweight concretes for thin-walled floating structures <i>A. Mishutin, S. Kroviakov, N. Mishutin and V. Bogutsky</i></p> <p>Coal bottom ash research program focused to evaluate a potential Portland cement constituent <i>M. A. Sanjuán, C. Argiz, E. Menéndez and A. Moragues</i></p> <p>Preliminary assessment of durability of a low carbon concrete made with limestone calcined clay Portland cement <i>F. Martirena, E. Díaz, A. Jose, R. Dayran, A. Adrian and K. Scrivener</i></p> <p>Effectiveness of various shrinkage prediction models for concrete made of crushed clay bricks as coarse aggregate <i>Syed I. Ahmad and S. Roy</i></p> <p>Permeability of hybrid concrete for sustainable bridge deck pavement <i>K. K. Yun, S. W. Lee and Y. H. Cho</i></p>			
CASE STUDIES III - Cs3		Room: 2 Chair: Piti Sukontasukkul Co-Chair: Kenichi Kata	
<p>LEAD PAPER - Sustainability of bridge structures. Indicator system <i>R. Valdivieso, J.R Sánchez Lavín and D. Fernández-Ordóñez</i></p> <p>Case study for combination of architectural and structural design for a sustainable and aesthetic façade for a multilevel car park <i>A. Bhate</i></p> <p>Large infrastructure economic, social and environmental sustainability assessment. An approach to the Canal de Navarra irrigation area case <i>J. E. Arizón Fanlo, D. Fernández-Ordóñez and J. A. Alfaro Tanco</i></p> <p>Sustainability evaluation of a new type concrete bridge structure <i>K.I. Kata, T. Shibata, A. Kasuga and K. Sakai</i></p> <p>Sustainability dimension of an elevated corridor over a greenfield <i>S. Bansal, S K Singh, P K Sharma and M. Bansal</i></p>			
ENVIRONMENTAL DESIGN III - E3		Room: 3 Chair: Giorgio Ferrari Co-Chair: Kenji Kawai	
<p>LEAD PAPER - Overview of resource conservation and closed-loop recycling in concrete toward sustainability <i>T. Noguchi</i></p> <p>Durability behaviour of sustainable cements exposed under real environmental conditions of the Mediterranean area <i>I. Sánchez, M.P. López, J.M. Ortega and M.A. Climent</i></p> <p>Strength development of concrete: balancing production requirements and ecological impact <i>S. Onghena, S. Grunewald and G. de Schutter</i></p> <p>Doing more with less: topology optimization as a means for the design of sustainable concrete forms <i>M. Donofrio</i></p> <p>Design and modeling of nanostructured sol-gel titania cement system for environmental applications <i>E. Cerro-Prada, S. García-Salgado, F. Escolano and M.A. Quijano</i></p>			
16:30 - 17:00		COFFE BREAK	

17:00 - 18:30

TECHNICAL SESSIONS

ENVIRONMENTAL DESIGN IV - E4

Room: 1
Chair: Takafumi Noguchi
Co-Chair: Ana Carmona

LEAD PAPER - New route to synthesize biobased PCE superplasticizer
J. Zimmermann and C. Fiuza

LEAD PAPER - A study on an indicator for environmental impacts of cement industry
K. Kawai, S. Hoshino, H. Hirao and S. Tanaka

Thermal mass improvement of lightweight concrete with modified aggregates
A. Gálvez, J. Cubillo and S Valcke

Life cycle assessment of waterproofing solution for concrete basement
A. Carmona, C. Fiuza and C. López

MATERIALS VIII - M8

Room: 2
Chair: María Cruz Alonso
Co-Chair: Nina Stirmer

LEAD PAPER - Future cements: research needs for sustainability and potential of LC3 technology
K. Scrivener

Efficiency factors of fly ash - a powerful tool for mix proportioning
S. Bhanja

Material properties and application to structure of low carbon high performance concrete using fly ash and blast furnace slag
H. Saito, A. Saito and K. Sakai

Paper as additive in concrete mixtures for low resistance blocks
M. Soares, E. Aguiar and G. Gomes

Use of incinerated sewage sludge ash in concrete production
N. Stirmer, A. Baričević, D. Nakic and D. Vouk

DURABILITY VI - D6

Room: 3
Chair: Francisca Puertas
Co-Chair: Takeju Matsuka

LEAD PAPER - Alkali-silica resistance of coal bottom ash mortars
C. Argiz, E. Menéndez and A. Moragues

Effect of incorporating Sugarcane Bagasse Ash (SCBA) in mortar to examine durability of sulfate attack
A. Joshaghani, A.A. Ramezani-pour and H. Rostami

Formation of air pores in concrete due to the addition of tire crumb rubber
A. Zimmermann, F. Röser and E. A. B. Koenders

Long-term effects of the hardening temperature and relative humidity on the microstructure and properties of mortars with active additions
J.M. Ortega, R.M. Tremiño, I. Sánchez and M.A. Climent

The influence of metakaolin and natural zeolite on the rheology, engineering and durability properties of high strength self-compacting concrete at the early age
K. Samimi, S. Kamali Bernard, A.A Maghsoudi and M. Maghsoudi

20:00 - 20:15

20.00 - GROUP PHOTO

20.15 - BUS DEPARTURE TO CONFERENCE DINNER

@Main Door of the Civil Engineering School of the Technical University of Madrid

20:30 - 22:30

CONFERENCE DINNER: *El Jardín de Somontes*

Wednesday, June 15

09:00 - 10:30 TECHNICAL SESSIONS

ENVIRONMENTAL DESIGN V - E5 Room: 1
Chair: Jörg Zimmermann
Co-Chair: Hiroshi Yokota

LEAD PAPER - Sustainability of concrete structures in changing world
P. Hajek

The French National Project RECYBETON, to recycle concrete into concrete
H. Colina and F. De Larrard

Sustainability and human habitat
M. Bastons and J. Armengou

Parametric analyses on sustainability indicators for design, execution and maintenance of conference structure
H. Yokota, S. Goto and K. Sakai

A A sustainability assessment approach based on life cycle assessment for structural retrofit of RC members
C. Menna, L. Napolano, D. Asprone and A. Prota

DURABILITY VII - D7 Room: 2
Chair: Encarnación Reyes Pozo
Co-Chair: María Jesús Casati

LEAD PAPER - The damage of calcium sulfoaluminate (CSA) cement paste partially immersed in Na₂CO₃ solution
Z. Liu, L. Hou, D. Deng and G. De Schutter

Porosity and resistivity measurement of accelerated cured geopolymer and conventional concrete
A Noushini and A. Castel

Pozzolanic materials obtained through a treatment methodology of landfills. Characterization of new cements and durability of concretes
F. Puertas, C. Varga, M.M. Alonso, A. Díaz-Bautista and S. Lizarraga

Pumpability of sustainable SCC mixtures
A. Rodríguez, G. Barluenga, O. Rio, I. Palomar, K. Nguyen, A. Sepulcre and M. Giménez

Robust design and durability of CO₂-reduced concrete with high amount of supplementary cementitious materials
C. Begemann and L. Lohaus

MATERIALS IX - M9 Room: 3
Chair: Jaime C. Galvez
Co-Chair: Ángela Moreno Bazán

Durability of high volume fly ash concrete used in channel revetment
Q. Bing, G. Jianming, S. Yejieng, Z. Ping and W. Fang

Properties of alkali-activated fly ash mortars made with multiple activators
N. Ghafoori, K. Sierra, M. Najimi and M. Sharbaf

Effect of internal alkali activation on long-term pozzolanic reaction of fly ash in cement paste
T. P. Bui, K. Ootaishi, Y. Ogawa, K. Nakarai and K. Kawai

The changing nature of fly ash and its reuse
C. Shearer

New permeability reducing admixture for sustainable concrete
G. Ferrari, G. Bianchin, V. Russo, D. Passalacqua, G. Artioli and L. Valentini

10:30 - 11:00 COFFE BREAK

11:00 - 13:30

TECHNICAL SESSIONS

ENVIRONMENTAL DESIGN VI - E6

Room: 1
Chair: Gyorgy L. Balazs
Co-Chair: Cristina Argiz

LEAD PAPER - Can a general structural code for both new and existing concrete structures enhance the way we approach sustainability for existing structures?
S. L. Matthews and G. Mancini

LEAD PAPER - Green concrete specification and environmental declarations of concrete
D. Choi, C.-U. Chae and M.-K. Lim

Self – compacting concrete CO₂ uptake
H. Witkowski and M. Koniarczyk

NO_x adsorption, fire resistance and CO₂ sequestration of high performance, high durability concrete containing activated carbon
M. Di Tommaso and I. Bordonzotti

Carbon emissions capturing in cement
V. Rheinheimer and P. J.M. Monteiro

CONSTRUCTION ASPECTS III - C3

Room: 2
Chair: Emily Lorenz
Co-Chair: M^a Belén González Fonteboa

LEAD PAPER - Shotcrete reinforced with recycled fibers from secondary waste of end of life tires
S. Serna, P. Serna, M.J. Pelufo, V. Orero and A. Llano

Eco-mechanical analysis of two lightweight fiber-reinforced cement-based composites
A.P. Fantilli, A. Gorino and B. Chiaia

Study of the use of different chemical admixtures in mortars manufactured with recycled sand from CDW
A.I. Torres-Gómez, C. Cingolani, E.F. Ledesma, V. Corinaldesi, J.R. Jiménez and J.M. Fernández

Refuse cork as lightweight aggregate for more sustainable masonry units
M. C. Pacheco, M. J. Arévalo, A. Macías and P. Serna

Development of environment-friendly blended cement and application of the cement to a building construction project
M. Yamada, N. Urushizaki and Y. Kawabata

DURABILITY VIII - D8

Room: 3
Chair: Adrian Zimmermann
Co-Chair: Atsushi Ueno

LEAD PAPER - Effect of phase change material on temperature shifting in concrete panels
P. Sukontasukkul, P. Chindapasirt, D. Choi and K. Sakai

Improvement of freezing and thawing durability on scaling of eco-cement extremely dry concrete under deicing agent condition
A. Ueno, M. Ishida, K. Uji and K. Ohno

Experimental study of concrete deterioration due to frost action
A. Marciniak and M. Koniarczyk

Geopolymerisation activity of Eifel Tuff
O. Vogt, N. Ukrainczyk, F. Roeser, E. Steindlberger and E. A. B. Koenders

Concrete as a radon barrier and its characterization
P. Linares, C. Andrade and D. Baza

12:30 - 13:30

TECHNICAL SESSIONS

DURABILITY IX - D9

Room: 1
Chair: Gonzalo Barluenga
Co-Chair: Marcos García Alberti

LEAD PAPER - Concrete cracking in marine micro-climates
P. Castro-Borges, A. A. Torres-Acosta, M. G. Balancán-Zapata and J. A. Cabrera-Madrid

Sustainability analysis of steel fibre reinforced concrete flat slabs
A. Blanco, A. de la Fuente and A. Aguado de Cea

A study on the crack distribution and characteristics of a continuously reinforced concrete pavement
HJ Jansen Van Rensburg and KJ Jenkins

Punching shear strength of concrete slabs reinforced with recycled steel fibres from waste tyres from Waste Tyres
M. Bartolac, D. Damjanović, J. Krolo and A. Baričević

DURABILITY X - D10

Room: 2
Chair: José A. Tenorio
Co-Chair: Katsufumi Hashimoto

LEAD PAPER -Durability of sustainable ternary blended concrete containing blast furnace slag and limestone filler
Á. Fernández, M.C. Alonso, J.L. García Calvo and M. Sánchez

Fundamental study on sorption characteristic of radionuclide ion in cement and blast furnace slag based samples
K. Hashimoto, N. Taguchi and H. Yokota

Plastic moment capacity evaluation for reinforced concrete frame elements by adopting the proper material constitutive laws
A. Faur and A. Puskás

Various durability aspects of cement pastes and concretes with supplementary cementitious materials
M. Saillio, V. Baroghel-Bouny and S. Pradelle

MATERIALS X - 10

Room: 3
Chair: Alejandro Perez Caldentey
Co-Chair: Jack Moffatt

Possible reusing of household ceramic wastes as mineral admixtures in ecological cement/concrete
I. Ding, H. Dong, Y. Zhang and C. Azevedo

A study of the sustainability potential of cement reduced concrete
J. S. Moffatt, M. Haist and H. S. Müller

Mechanical behaviour of concrete using recycled granulated steel
U. M. T. Qadir, K. Islam, A. H. M. M Billah and M. S. Alam

Structural behaviour of recycled concrete: mechanical strength, shrinkage and bond strength
S. Seara Paz, V. Corinaldesi, B. González Fonteboa and F. Martínez-Abella

13:30 - 15:00

LUNCH BREAK

15:00 - 16:30

TECHNICAL SESSIONS

MATERIALS XI - 11

Room: 1
Chair: Ramiro Garcia Navarro
Co-Chair: Julie Buffenbarger

LEAD PAPER - Influence of temperature on the rheology of pastes and selfcompacting mortars with sustainable binders

A. Pacios, A. Köening and F. Dehn

Use of photocatalytic cements for heavy duty urban roads

G.L. Guerrini, R. Crespo and R. Jurado

High performance sustainable mortars

D. Hesselbarth, C. Fiuza and T. Moser

Dosage of economic self-compacting concrete with low and medium compressive strength

G. Rodríguez de Sensale, I. Rodríguez Viacava, R. Rolfi and A. Aguado de Cea

Influence of physicochemical and microstructural properties of TiO₂ cementitious materials on hydroxyl radicals production and photocatalytic pollution degradation

E. Jiménez-Relinque and M. Castellote

CONSTRUCTION ASPECTS IV - C4

Room: 2
Chair: Silvino Pompeu-Santos
Co-Chair: Marta Palacios

TRC multilayer precast façade panel: structural behaviour in freezing-thawing condition

I.G. Colombo, M. Colombo and M. di Prisco

Innovative precast concrete structural floor as a part of a HVAC System. The real application experience in a building

F. Pich-Aguilera, P. Casaldaliga and U. Muencheberg

An experimental study on precast concrete beam-to-column connection using interlocking bars.

V. A. Noorhidana and J. P. Forth

Lessons learned from a life-cycle assessment of north american precast concrete

D. Frank and E. Lorenz

A case of study for embedding RFID tags in precast concrete

R. Alonso-Calvo, M. García-Remesal and D. Fernández-Ordóñez

DURABILITY XI - D11

Room: 3
Chair: Concepción Pacheco
Co-Chair: Takao Ueda

Influence of C3A content on chloride transport in concrete

K. Y. Ann, M. J. Kim and H. S. Jung

Evaluation of mechanical properties and accelerated Chloride Ion Penetration (RCMT) in alkali activated slag concrete

A.A. Ramezaniapour, F. Bahman Zadeh, A. Zolfagharnasab, M. R. Pourebrahimi and A. M. Ramezaniapour

Assessment of four electrical measurement methods for assessing the chloride resistance of concretes

A. Pilvar, A.A. Ramezaniapour, H. Rajaie and S.M. Motahari Karein

Carbonation-resistant evaluation of the fly-ash concrete in consideration of the pozzolanic reaction

K. Imagawa and A. Koyama

Steel corrosion in recycled aggregate concrete containing amino acid

T. Ueda, K. Aihara and T. Iiboshi

16:30 - 17:00

COFFE BREAK

17:00 - 17:30

CLOSING CEREMONY

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