

Fire Spalling Workshop 2019 Programme

Wednesday, 18 September 2019	
18:00-19:30	Registration & Welcome Drinks Reception (The Diamond Reception)
Day 1: Thursday, 19 September 2019	
Lecture Theatre 3, Lower Ground Floor, The Diamond	
08:30-09:00	Registration & Arrival Refreshment (Lower Ground Floor, The Diamond)
09:00-09:05	Introduction: Dr. Shan-Shan Huang (Chair), The University of Sheffield, UK
09:05-09:20	Opening Speech: Prof. Buick Davison, Deputy Head of Department, The University of Sheffield, UK
Keynotes	
09:20-09:40	An update on the activities of the RILEM Technical Committee 256-SPF: Spalling of concrete due to fire: testing and modelling <i>Pierre Pimienta</i> <i>CSTB, France</i>
09:40-10:10	Fire spalling theories – Realistic and more exotic ones <i>Robert Jansson McNamee</i> <i>Brandskyddslaget, Sweden</i>
10:10-10:40	An update on the revisions of Eurocode 1992-1-2 <i>Jenny Burridge</i> <i>The Concrete Centre, UK</i>
10:40-11:00	Group Photo
11:00-11:20	Coffee Break
Session 1: Codes and Standardisation - Session Chair: Pierre Pimienta	
11:20-11:35	Application of concrete spalling mitigation: a north American perspective <i>Kevin Mueller¹, Stephen Stacey², Anthony Bentivegna²</i> <i>¹Thornton Tomasetti, USA</i> <i>²Jensen Hughes, USA</i>
Session 2: Spalling Tests - Session Chair: Pierre Pimienta	
11:35-11:50	Mitigation of fire-induced spalling of concrete using recycled tyre polymer fibre <i>Yifan Li¹, Shan-Shan Huang¹, Kypros Pilakoutas¹, Harris Angelakopoulos², Ian Burgess¹</i> <i>¹The University of Sheffield, UK</i> <i>²Twincon Ltd, UK</i>
11:50-12:05	Experimental study of the spalling behaviour of ultra-high performance fibre reinforced concrete during fire <i>Martin Schneider¹, Aljoša Šajna²</i> <i>¹Carinthia University of Applied Sciences, Austria</i> <i>²Slovenian National Building and Civil Engineering Institute, Slovenia</i>
12:05-12:20	Investigation of size effects in concrete spalling <i>André Klimek, Sascha Hothan, Andreas Rogge</i> <i>Bundesanstalt für Materialforschung und -prüfung, Germany</i>
12:20-12:35	Effect of geometry in concrete spalling risk subjected to high temperatures for thermal inertia studies <i>Tamara Lucio-Martin, Javier Puentes, Maria Cruz Alonso</i> <i>Eduardo Torroja Institute for Construction Sciences (IETcc-CSIC), Spain</i>
12:35-12:50	In situ concrete spalling risk assessment in tunnel by means of a mobile oil-fired furnace <i>Dominique Pardon¹, Pierre Pimienta¹, Benoît-Louis Marie-Jeanne¹, Stéphane Hameury¹, Nicolas Pinoteau¹, Bérénice Moreau², Laetitia D'aloia Schwartzentruber², Catherine Larive², Pierre Peyrac³, Xavier Thollard⁴</i> <i>¹CSTB, France</i> <i>²CETU, France</i> <i>³DRIEA-IF, France</i> <i>⁴SETEC Bâtiment, France</i>
12:50-13:50	Lunch

Session 3: Spalling Tests - Session Chair: Robert Jansson McNamee

13:50-14:05	Investigation of the preventive effect on fire spalling of natural jute fibre in high performance concrete through ring-restrained specimen tests <i>Mitsuo Ozawa, Makiho Sukekawa, Haruka Akasaka</i> <i>Gunma University, Japan</i>
14:05-14:20	Fire-related spalling evaluation of ring-restrained polymer cement mortar and normal cement mortar <i>Yusuke Sugino¹, Mitsuo Ozawa², Toru Tanibe¹</i> <i>¹Taiheiyo Materials, Japan</i> <i>²Gunma University, Japan</i>
14:20-14:35	Spalling behaviour of UHPC with modified microstructure due to fire load <i>Johannes Kirnbauer</i> <i>Vienna University of Technology, Austria</i>
14:35-14:50	Australian large scale structural fire test facility for concrete tunnel linings <i>Maurice Guerrieri¹, Sam Fragomeni¹, Carlos Sanabria², Wei Ming Lee², Esteban Pazmino³</i> <i>¹Victoria University, Australia</i> <i>²Lendlease Engineering Pty Ltd, Australia</i> <i>³John Holland Group, Australia</i>
14:50-15:05	Prevent high strength concrete from spalling subject to ISO 834 fire <i>Yong Du¹, Honghui Qi²</i> <i>¹Nanjing Tech University, China; ²National University of Singapore, Singapore</i>
15:05-15:20	Laboratory fire testing on tunnel segments : Suez canal tunnels case <i>Pierre Pimienta¹, Martin Doll², Dimitrios Rizos³, Mahmoud Shamma⁴, Benoît-Louis Marie-Jeanne¹, Philippe Rivillon¹, Ménad Chenaf¹, Mourad Bakhom⁵, Ahmed Fouda⁶, Tarek Gewaily⁷, Yehia Hussein⁸, Tarik Youssef⁹, Sameh Saad¹⁰, Tarek Amin³</i> <i>¹CSTB, France; ²Arcadis ESG, France; ³Orascom Constructions, Egypt</i> <i>⁴The Petroleum Projects & Technical Consultations co., Egypt; ⁵Cairo University, Egypt</i> <i>⁶National Authority for Tunnels, Egypt; ⁷Engineering Authority for the Egyptian Armed Force, Egypt</i> <i>⁸National Research Center, Egypt; ⁹L'Université Française d'Égypte, Egypt</i> <i>¹⁰Arab Consulting Engineers, Egypt</i>

15:20-15:45 Coffee Break

Session 4: High Temperature Testing of Concrete - Session Chair: Jenny Burrige

15:45-16:00	Influence of the chemical and physical properties of hardened cement paste on the fire-induced spalling of concrete <i>Jochen Reiners, Christoph Müller</i> <i>Research Institute of the Cement Industry, Germany</i>
16:00-16:15	Heat-induced concrete spalling of new and aged concrete encased steel columns in hydrocarbon pool and jet fires <i>Holly Warren, David Wickham</i> <i>AkzoNobel, UK</i>
16:15-16:30	Evolution of thermal conductivity on CAC concrete at high temperatures and during thermal fatigue tests <i>Tamara Lucio-Martin¹, Maria Cruz Alonso¹, Marta Roig-Flores^{1,2}, Luís Guerreiro³</i> <i>¹Eduardo Torroja Institute for Construction Sciences (IETcc-CSIC), Spain</i> <i>²Universitat Politècnica de València, Spain; ³University of Evora, Portugal</i>
16:30-16:45	Transport and reconfiguration of moisture in HPC due to unilateral heating <i>Ludwig Stelzner¹, Frank Weise¹, Tyler Oesch¹, Raphael Dlugosch², Bartosz Powierza¹</i> <i>¹Bundesanstalt für Materialforschung und -prüfung, Germany</i> <i>²Leibniz Institute for Applied Geophysics, Germany</i>
16:45-17:00	Physical-based model for load-induced thermal strain (LITS) of concrete at high temperature <i>Quang X. Le^{1,3}, Jose L. Torero², Vinh T.N. Dao¹</i> <i>¹The University of Queensland, Australia; ²University College London, UK</i> <i>³University of Science and Technology, Vietnam</i>

18:00-21:30 Banquet Dinner at Kelham Island Museum

Day 2: Friday, 20 September 2019	
Lecture Theatre 3, Lower Ground Floor, The Diamond	
08:30-09:00	Registration & Arrival Refreshment (Lower Ground Floor, The Diamond)
Keynotes	
09:00-09:30	Experimental investigations into the spalling of high strength concrete and the fire performance of tunnel linings <i>Tom Lennon</i> <i>BRE Group, UK</i>
09:30-10:00	An overview of the RILEM State-Of-The-Art Report on the modelling of concrete behaviour at high temperature <i>Alain Millard</i> <i>CEA, France</i>
Session 5: Effect of Spalling on Fire Resistance - Session Chair: Benedikt Weber	
10:00-10:15	Effect of loss of concrete cover on the fire resistance of reinforced concrete (RC) beams: Numerical study using fiber beam-column element <i>Hitesh Lakhani, Jan Hofmann</i> <i>University of Stuttgart, Germany</i>
10:15-11:00	Diamond Tour
11:00-11:30	Coffee Break
Session 6: Modelling - Session Chair: Benedikt Weber	
11:30-11:45	Concrete spalling failure: a coupled buckling instability and crack failure analytical model <i>Matteo De Poli¹, Kees Blom^{2,3}, Bas Lottman⁴</i> <i>¹ Fluor Infrastructure, Netherlands</i> <i>² Delft University of Technology, Netherlands</i> <i>³ Municipality of Rotterdam, Netherlands</i> <i>⁴ Witteveen+Bos, Netherlands</i>
11:45-12:00	Open issues in modelling concrete at high temperature <i>Benedikt Weber</i> <i>Empa, Switzerland</i>
12:00-12:15	The effect of micro-structural mechanisms on the macro-level behaviour of cementitious materials at elevated temperatures <i>Jiayi Wang, Colin T Davie, Enrico Masoero</i> <i>Newcastle University, UK</i>
12:15-12:30	Flash vaporization next to an opening crack: a possible explanation of the explosive nature of concrete spalling <i>Roberto Felicetti¹, Ramin Yarmohammadian¹, Stefano Dal Pont², Alessandro Tengattini³</i> <i>¹ Politecnico di Milano, Italy</i> <i>² Université Grenoble Alpes, France</i> <i>³ Institut Laue-Langevin, France</i>
12:30-13:40	Lunch
Session 7: Other Research Topics - Session Chair: Tom Lennon	
13:40-13:55	Correlation between concrete tensile strength and intrinsic permeability towards the evaluation of spalling susceptibility <i>Johann van der Merwe¹, Fangxia Lu², Mario Fontana¹</i> <i>¹ ETH Zürich, Switzerland</i> <i>² Baertschi Partner AG, Switzerland</i>
13:55-14:10	Assessing spalling risk in buildings: Considering spalling in probabilistic fire safety design <i>Ieuan Rickard¹, Ian Fu¹, Danny Hopkin¹, Luke Bisby²</i> <i>¹ OFR Consultants, UK</i> <i>² The University of Edinburgh, UK</i>

14:10-14:25	<p>Thermal and mechanical response of reinforced concrete slabs under natural and standard fires</p> <p><i>Siyimane Mohaine¹, Nataša Kalaba¹, Jean-Marc Franssen², Luke Bisby³, Alastair Bartlett³, Jean-Christophe Mindeguia⁴, Robert McNamee⁵, Jochen Zehfuss⁶, Fabienne Robert¹</i></p> <p>¹ CERIB, Epernon, France</p> <p>² Liège University, Belgium</p> <p>³ The University of Edinburgh, UK</p> <p>⁴ University of Bordeaux, France</p> <p>⁵ Brandskyddslaget, Sweden</p> <p>⁶ IBMB, Germany</p>
14:25-14:40	<p>Atomic structural evolution of calcium-containing alkali-activated metakaolin exposed to fire conditions</p> <p><i>Karina Alventosa, Claire E. White</i></p> <p>Princeton University, USA</p>
14:40-15:00	Coffee Break
Session 8: Protective Measures - Session Chair: Alain Millard	
15:00-15:15	<p>Application of laminated ferrocement, high tensile laminated ferrocement and cellular concrete to fire prevention and fire restoration of concrete structures</p> <p><i>Michael Pemberton¹, Alasdair Beal², Anthony Tucker¹, Paul Nedwell³, Martin Pullan¹</i></p> <p>¹ Trafalgar Marine Technology Ltd, UK</p> <p>² Thomasons Ltd, UK</p> <p>³ Manchester University (Retired), UK</p>
15:15-15:30	<p>Experimental and numerical study of the influence of the PP fiber diameter on spalling behaviour of concrete</p> <p><i>Fariza Sultangaliyeva¹, Chhainan Leang², H��l��ne Carr��¹, Christian La Borderie¹, Nicolas Roussel³</i></p> <p>¹ Universit�� de Pau et des Pays de l'Adour, France</p> <p>² INSA Rennes, France</p> <p>³ IFSTTAR, France</p>
15:30-15:45	<p>Experimental contribution to the optimization of the choice of polypropylene fibers in concrete for its thermal stability</p> <p><i>Fariza Sultangaliyeva¹, Bruno Fernandes¹, H��l��ne Carr��¹, Pierre Pimienta², Christian La Borderie¹, Nicolas Roussel³</i></p> <p>¹ Universit�� de Pau et des Pays de l'Adour, France</p> <p>² CSTB, France</p> <p>³ IFSTTAR, France</p>
15:45-16:15	Closing Ceremony