

1st international seminar for

# Fire Safety of Facades

**Programme**

Organised by

**CSTB**  
*le futur en construction*

**Paris, France**  
**14-15 November 2013**





## Building the future

CSTB, Scientific and Technical Center for Building, is a public organization for innovation in building which performs four key activities, namely research, expertise, evaluation and dissemination of knowledge, organized to satisfy sustainable development challenges in the world of construction.

Its field of expertise covers construction products, buildings and their integration into districts and cities.

With its 918 employees, subsidiaries and networks of national, European and international partners, CSTB offers its service to all parties involved in construction to improve the quality and safety of buildings.

## Day 1 Thursday 14 November 2013

08.00 Registration

09.00 Welcome and introduction by H. Charrue (CSTB), Research and Development Director and L. Boström (SP), Chairman of the scientific committee

### Fire safety engineering

(Chair: Esko Mikkola, KK-Fireconsult Ltd, Finland)

09.30 **Effects of Side Walls on Facade Flame Entrainment and Flame Height from Opening in Compartment Fires**

*L.H.Hu, K.H.Lu, F.Tang, State Key Laboratory of Fire Science, University of Science and Technology of China, China, Michael Delichatsios, University of Ulster, FRESERT, United Kingdom and L.H. He, State Key Laboratory of Fire Science, University of Science and Technology of China, China*

09.50 **Computer-simulation study on fire behaviour in the ventilated cavity of ventilated facade systems**

*Maria Pilar Giraldo, Ana Lacasta, Jaume Avellaneda, Camila Burgos, Catalan Institute of Wood, Spain*

10.10 **Comparative assessment of CFD tools and the Eurocode methodology in describing externally venting flames**

*Eleni Asimakopoulou, Dionysios Kolaitis, Maria Founti, National Technical University of Athens, Greece*

10.30 Coffee break

### Poster presentation

(Chair: Stefan Winter, TUM, Germany)

12.20 Lunch and poster session

13.50 Sponsor presentation

### Regulation

(Chair: Dhionis Dhima, CSTB, France)

14.00 **A new approach to the Danish guidelines for fire protection of combustible insulation**

*Anders Dragsted, Anders Bach Vestergaard, Danish Institute of Fire and Security Technology, Denmark*

14.20 **A risk-informed appraisal of prescriptive building separation regulations in Switzerland**

*Jakob Studhalter, Basler & Hofmann AG, Switzerland.*

14.40 **Comparative analysis of facade regulations in the Nordic countries**

*Michael Strömngren, Joakim Albrektsson, SP Technical Research Institute of Sweden, Sweden, Anders Johansson, The National Board of Housing, Building and Planning, Sweden and Erik Almgren, Bengt Dahlgren, Fire & Risk, Sweden*

15.00 **Fire safety of wooden balconies, facades and eaves**

*Esko Mikkola, KK-Fireconsult Ltd, Finland*

15.20 Coffee break

### Facade systems, tests and assessment methods

(Chair: Birgit Östman, SP, Sweden)

16.00 **Experimental study on fire propagation over combustible exterior facades in Japan**

*Yuhei Nishio, The University of Tokyo, Japan, Hideki Yoshioka, National Institute for Land and Infrastructure Management, Japan, Takafumi Noguchi, The University of Tokyo, Japan, Tatsuo Ando, Mitsubishi Plastic, Inc., Japan, and Masamichi Tamura, The University of Tokyo, Japan*

16.20 **Fire safety of EPS insulated facades in residential multi-storey buildings**

*Esko Mikkola, KK-Fireconsult Ltd, Finland, Tuula Hakkarainen and Anna Matala, VTT Technical Research Centre of Finland, Finland*

- 16.40 **Fire resistance without fire resistant glazing**  
*Johan Koudijs, Csilla Csoke, DGMR, Netherlands*
- 17.00 **Fire spread modes and performance of fire stops in vented facade constructions - overview and standardization of test methods**  
*Geir Jensen, COWI AS, Norway*
- 17.20 **Facade fire tests – measurements and modeling**  
*Johan Anderson, Robert Jansson, SP Technical Research Institute of Sweden, Sweden*
- 17.40 **Experimental study of the fire performance of wooden facades**  
*Martin Teibinger, Irmgard Matzinger, Peter Schober, Holzforschung Austria, Austria*
- 20.00 **Gala dinner**



## Day 2 Friday 15 November 2013

### Fire safety engineering

(Chair: Gert van den Berg, Efectis, The Netherland)

09.00 **Contribution to a study by numerical simulation of a fire plume coming out through a window on facade "Application to the comprehension of the wind influence on an eventually stack effect"**  
*Bernardo Martinez Ramirez, Scientific and Technical Centre for Building, France.*

09.20 **Facade fires in Swedish school buildings**  
*Nils Johansson, Patrick Van Hees, Lund University, Sweden, Margaret Simonson McNamee, Michael Strömgren, Robert Jansson SP Technical Research Institute of Sweden, Sweden*

09.40 **A qualitative study on real-scale double-skin facade fires**  
*Cheuk Lun Chow, City University of Hong Kong, Hong Kong SAR China*

10.00 **Experimental investigation of flame impingement on vertical and inclined glazing facade**  
*Michael Quinn, Ali Nadjai, Faris Ali, Dimitri Bakirtzis, University of Ulster, United Kingdom*

10.20 Coffee break

### Products and material, tests and assessment methods

(Chair: Martin Teibinger, HFA, Austria )

10.50 **Fire performance of multi-storey wooden facades**  
*Birgit Östman, Lazaros Tsantaridis, SP Wood Technology, Sweden*

11.10 **Gypsum plasterboards enhanced with phase change materials - a fire safety assessment using experimental and computational techniques**  
*Dionysios Kolaitis, Eleni Asimakopoulou, Maria Founti, National Technical University of Athens, Greece*

11.30 **Fire hazards of exterior wall assemblies containing combustible components**  
*Nathan White, Commonwealth Scientific and Industrial Research Organisation, Australia, Michael Delichatsios, University of Ulster, Northern Ireland, Marty Ahrens, National Fire Protection Association (NFPA), Quincy, MA., Amanda Kimball, Fire Protection Research Foundation, United States*

11.50 **Calculation of radiant heat flux from compartment fires in various ventilation conditions**  
*Devin Glenie, George Hadjisophocleous, Carleton University, Canada*

12.10 **Fire safety in timber-based element facade-systems**  
*Stefan Loebus, Norman Werther, Stefan Winter, Technische Universität München, Germany*

12.30 Summary and closure by S. Vallerent and L. Boström

12.50 Lunch

## Poster session

- 11.00 **Fire safety of ETICS with EPS material properties and relevance for fire safety during transport, construction and under end use conditions in an ETICS**  
*Edith Antonatus, BASF SE, Germany*
- 11.05 **Fire hazard analysis of facade systems in reconstructing buildings**  
*Giletich Anatoly Nikolaevich –Department of Supervision EMERCOM of Russia, Candidate of Technical Sciences, Russia, Kosachev Andrey Arcad'yevich, Research Center of Fire Prevention, Head of Department, Candidate of Technical Sciences, Russia and Kosachev Andrey Andreevich, Moscow State University of Civil Engineering, Russia.*
- 11.10 **Fire resistance of 'high-tech plastics' - results of a test series about the fire resistance of glass-fiber reinforced polyester composite**  
*Johan Koudijs, Jhon de Wild, DGMR, the Netherlands and Jack Smit, Polux B.V., The Netherland*
- 11.15 **Fire resistance tests of large glazed aluminium curtain wall test specimens - results comparison**  
*Bartlomiej Sedlak, Fire Research Department of Building Research Institute and Military University of Technology, Poland, Jacek Kinowski and Andrzej Borowy, Fire Research Department of Building Research Institute, Poland*
- 11.20 **Fire test of PUR insulation with different fire protecting claddings**  
*Anders Dragsted, Anders Bach Vestergaard, Danish Institute of Fire and Security Technology, Denmark*
- 11.25 **EPS insulated facade fires from a fire and rescue perspective**  
*Mia Kumm, Jenny Söderström, Mälardalen University, Sweden and Anders Lönnermark, Mälardalen University and SP Technical Research Institute of Sweden, Sweden*
- 11.30 **Experimental study on fire barriers preventing vertical fire spread in ETICS**  
*Xin Huang, Zhaopeng Ni, Lei Peng and Ping Zhuo, Tianjin Fire Research Institute of the Ministry of Public Security of China, China*
- 11.35 **Experimental and numerical study on fire spread upon double-skin glass facades**  
*Lei Peng, Zhaopeng Ni, Xin Huang, Tianjin Fire Research Institute of the Ministry of Public Security of China, China*
- 11.40 **Fire behaviour of facades with thermal insulation**  
*Michael Schumm, Saint-Gobain Construction Products Central Europe, Ladenburg, Germany*
- 11.45 **Semi-natural test methods to evaluate fire safety of wall claddings**  
*Miroslav Smolka, Birgitte Messerschmidt, John Scott, Bruce le Madec, Rockwool International A/S, Denmark*
- 11.50 **Mechanism of fire spread on facades and the new Technical Report of EOTA "Large-scale fire performance testing of external wall cladding systems"**  
*Ingolf Kotthoff & Jan Riemesch-Speer, Ingenieurbüro für Brandschutz bei Fassaden (IBF) and Deutsches Institut für Bautechnik (DIBt), Germany*
- 11.55 **The Italian National Guidelines for the fire safety of facades**  
*Lamberto Mazziotti and Piergiacomo Cancelliere, Ministry of Interior, Italian*
- 12.00 **Artificial and natural weathering of fire proofed wood cladding**  
*Christophe Belloncle, Mark Irle, LUNAM Université, Ecole Supérieure du Bois, France and Jean-Baptiste Aurel, WOODENHA, France*
- 12.05 **Performance of different fire retardant products applied on Norway spruce tested in a Cone calorimeter**  
*Josef Koegl, Paul Hartmann, Wilfried Beikircher, University of Innsbruck, Austria*
- 12.10 **Facade fire - Fire Safety Engineering Methodology**  
*Franck Didieux, LNE, France*

## Scientific committee

A selection of leading professionals, constituting our Scientific Committee, has worked with us on the selection of papers for SFS2013. We would like to thank you all for your expertise and enthusiasm!

### **Lars Boström, chair, SP, Sweden**

Dr. Lars Boström has been managing the Fire Resistance division at SP since 1999. He has over 25 years experience in standardization and development of test methods and procedures in different organizations such as CEN and RILEM. The main research interest today is in the field of fire safety engineering and especially on modelling and experimental verification of load bearing structures.

### **Dhionis Dhima, CSTB, France**

Dr. Dhionis Dhima has over twenty years of international experience in fire safety research and engineering. He has been involved in various French and European projects dealing in particular with fire resistance of wood and steel products. Dr Dhima is also an active member of numerous standardization and pre-standardization groups: CEN TC127, ISO TC92, CIB W14. In 2013 he achieved his habilitation qualification (highest academic qualification) in the field of fire safety.

### **Birgit A.-L. Östman, SP Wood Technology, Sweden**

Birgit A.-L. Östman is senior research leader at SP Wood Technology, Stockholm, Sweden. She has a long experience in fire research with a specific focus on fire safety in timber buildings. Activities cover aspects from reaction to fire, fire resistance and active fire protection to building regulations and industrial applications. She has been coordinating major national and international projects and is an expert in international standard committees for fire safety within ISO, ASTM and CEN. Her publications include numerous scientific papers in peer-reviewed journals, proceedings and research reports. The latest major publication is the very first European guideline on Fire safety in timber buildings.

### **Tony Baker – BRE Global, UK**

Tony Baker is a principle consultant at BRE Global and project manages the large scale fire testing for external cladding systems and is the joint author of the recently published third edition of BR135 - Fire Performance of external thermal insulation for walls of multistorey buildings. Tony is also the Senior Certification Scheme Manager for the LPCB Passive Fire Protection group and has been involved with testing and certification for over 30 years, with 25 years at British Standards Institution (BSI) – Product Services division before moving to BRE/LPCB in 2004.

### **Kim Woon Hyung, Kyungmin College, South Korea**

Kim, Woon Hyung is professor in the department of fire safety administration at Kyungmin College, South Korea. Since 2007, he is also the SFPE President of Korea Chapter and since 2003 the head of delegate KOREA in the standardization group ISO TC92 (Fire Safety). He works currently on major projects dealing with fire safety evaluation for railway system, development of localized egress software for multi-use occupancy and evaluation method of flame spread in building material.

### **Stéphanie Vallerent, CSTB, France**

Ms. Stéphanie Vallerent is a junior researcher in the Safety, Structure and Fire Department at CSTB. She held a MSc from the Massachusetts Institute of Technology and a MSc from the École Polytechnique in 2010. Her main area of expertise is fluid dynamics, smoke movement and CFD simulation. She joined CSTB in 2010 where she is in charge of developing research partnership and coordinating research activities on fire.



**Hideki Yoshioka – NILIM, Japan**

From undergraduate through doctoral course, Dr. Hideki Yoshioka has concentrated on research of building fire safety at The University of Tokyo. After working for Ministry of Land, Infrastructure, and Transport for one year, he restarted his fire research at Building Research Institute. Also, he has been a part-time lecturer of fire protection engineering at the University of Tokyo. In 2011, he was transferred from BRI to NILIM with promotion to the position of senior researcher. Currently, he is mainly involved with such research themes as façade fire (test, standardization, verification), sandwich panel fire (test, standardization), heat release measurement methodology, as well as ISO activities representing Japan with project leading for heat flux meters use in fire tests. Moreover, he is the main author of JIS (Japanese Industrial Standard) draft for “Test Method for Fire Propagation over Building Facades” which will be submitted to JSA (Japanese Standards Association) in November 2013.

**Hervé Tephany, DSC, France**

Mr. Hervé Tephany is a Principal Engineer for Fire Engineering, Research and Fire Behaviour at the French Ministry of the Interior. He is responsible of the preparation of the French regulations on fire behaviour of construction products and building elements (reaction and resistance to fire). From 1993 to 2005 he was the French delegate at the fire regulators group, instituted by the European Commission for the implementation of the directive (89-106) on construction products. Mr. H. Tephany is also chairman and member of French standardization commissions in the fire field.

**Noureddine Benichou – NRC, Canada**

Dr. Noureddine Bénichou is a Senior Research Officer at the National Research Council of Canada. He holds a Ph.D. from Carleton University, Ottawa, Canada, in Civil Engineering, and is the author of over 150 publications. His research areas include fire resistance modeling and experimentation of structures, and fire risk analysis. Before joining the Fire Research Program, he worked as a consultant developing design guidelines for use in performance-based building codes, and conducting studies on the trade-offs of fire department response time versus sprinkler protection. Dr. Bénichou is a member of SFPE, CIB and CSCE, represents Canada, as a the SC4 Chair, in ISO/TC92/SC4, and is an Adjunct Professor in the Department of Civil and Environmental Engineering at Carleton University.

**Gert van den Berg – Efectis, The Netherlands**

In 1990 Gert van den Berg graduated at Technical University Delft (Netherlands) in Mechanical Engineering, after which in 1995 a Ph.D. thesis was finalised on the subject of Pipeline Deformation Behaviour under Mechanical Loading. In the period 1995 – 1998, Dr. Gert van den Berg worked for VECTRA Technologies Ltd, which provides consultancy for the safety and integrity of oil&gas facilities. Since 1999, he joined the Dutch TNO institute, and worked in the field of Fire Safety. Since 2005, he is representative for The Netherlands in CEN TC 127 – Fire Safety in Buildings. He is lecturer in many (inter)national courses, congresses on all sorts of fire issues. He is also chairman of several national and international standardization committees, e.g. of TG7 which is responsible for the 5-year review of the European standards. He is also involved in assessment of practical applications of test results.

**Andrey Kossachev, VNIPO, Russia**

Dr. Andrey Kossachev is Colonel of Internal Service and Deputy of the Head of the Scientific Center of FGBU VNIPO of EMERCOM, Russia since 2006. He organizes scientific activities in the area of fire resistance and fire safety engineering. He took part in development of a number of the acts of law and standards in the area of fire safety. He is one of the authors of the methodology concerning implantation of the Fire Safety Engineering (FSE) in the standardization practice. He is the delegate of ISO TC 92. He has published more than 50 scientific papers

**Martin Teibinger, HFA, Austria**

DI Dr. Martin Teibinger has worked in the field of timber construction for more than 15 years. Since 2006 he is the manager for the field “building physics” in the Holzforschung Austria. His main fields of interest are building physics, multi-storey timber housing, expertise and standardization. Since 2012, he teaches fire safety of timber constructions at the University of Natural Resources and Life Sciences Vienna. DI Dr. Teibinger holds a civil engineer diploma and a PhD from the technical university of Vienna.



**Greg Baker – Branz Ltd, New Zealand**

Greg Baker has been employed in the New Zealand building and construction industry for almost 25 years and for the last eleven years Greg has been employed by BRANZ Ltd, based near New Zealand's capital city, Wellington. Greg works for BRANZ as manager of the fire and structural engineering section, with overall responsibility for a programme that provides research, testing and consultancy services to the New Zealand, Australian and Asia-Pacific building and construction industries in the fields of fire safety and structural engineering. Greg is also team leader for the BRANZ fire research programme, specialising in design fires, passive fire protection and structures in fire.

**Ni Zhaopeng, TFRI, China**

Ni Zhaopeng, born in 1966, has been working in Tianjin Fire Research Institute (TFRI) for more than 26 years. He is the head of the fire code department of TFRI and the main writer of the fire code of China. He is not only the expert of standardization related to fire protection in China, but also one of the delegates of SAC to ISO TC92 SC4. His expertise includes standardization, building fire protection and fire safety engineering. Under his instruction, his team has completed several key national projects from 9th to 12th five year plan of China. He currently revises the prescriptive fire code and develops the first performance-based fire code of China. During the past ten years, he has been the supervisor of 4 post-doctors, 2 doctor candidates and 4 Master candidates from several universities of China.

**Esko Mikkola, KK-Fireconsult Ltd, Finland**

Dr Esko Mikkola has nearly 30 years of experience in fire research and development covering several topics: fire safety assessment of products and systems (buildings, vehicles, etc.); large scale fire tests; development of fire test methods; analysis of ignitability, heat release, smoke production and toxicity; development of regulations and guidance. Dr Mikkola has been the leader of many research projects and he has been actively participating in standardisation (CEN, ISO, IMO) and in the Expert Group of Fire issues of EU Commission.

**Sarah Colwell, BRE Global, UK**

Sarah is a business group manager at BRE Global and has over twenty five years' experience in the field of fire and explosion protection. Sarah is actively involved in the development codes and standards for Reaction to Fire performance testing of building envelopes and is a member both National and European Standards committees working on these topics. She is also the author of several guidance documents in this area and regularly presents on the issues of external fire spread via cladding systems. As part of her role she undertakes a wide range of research and consultancy programmes for a broad spectrum of clients, including government and commercial clients on issues relating to the reaction to fire performance of products, regulatory guidance and standard test development in range of scenarios including the transportation sector and the built environment.

**Sebastian Hauswaldt, MFPA Leipzig, Germany**

Sebastian Hauswaldt represents MFPA Leipzig and has been head of the working group fire behaviour of building components and special constructions since 2012, including responsibility for the fire testing of insulated and ventilated facades in one of three facade fire benches. These are usually used for common fire tests and also for the development of German standard fire tests on facades. Within the scope of a doctoral fellowship at the BAM Federal Institute for Materials Research and Testing (Berlin), he has developed three dimensional material models for the simulation of structural steel components in the case of fire since 2008. Mr. Hauswaldt studied construction engineering at the Technical University Hamburg and the University Leipzig and has worked, since 2005, in the field of fire behaviour of structural components.

**Michael Merk, TUM, Germany**

Michael Merk is research associate at the chair of Timber Structures and Building Construction in the Faculty for Building Structures and Survey since 2005. Since 2008 he is also the head of the Timber Testing Laboratory and the operations manager of MPA BAU (Material testing laboratory) at the technical university of München. Since 2009 Mr. Merk also owns FIRE&TIMBER.ing, an office for fire safety engineering. Michael Merk studied civil engineering at Technical University of Graz (Austria)

## Sponsors



By developing new measurement techniques and methods and applying them via appropriate standards in all spheres of daily life, LNE plays a key role in promoting a more competitive economy and a safer society. This core activity covers five key spheres – research and technology transfer, testing and calibration, technical assistance, certification, training – and addresses the five major priorities: safety and health, environmental impact, performance, product reliability, and cost control.



EFFECTIS France is the privileged partner of the construction actors who have to officially justify the fire behavior of their products, or to act in respect of the fire safety regulations. EFFECTIS France is able to respond effectively to all the testing requests in the resistance and reaction to fire fields.

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