

# PROGRAMME

**HUMAN BEHAVIOUR IN FIRES SYMPOSIUM**  
**13-15<sup>TH</sup> July 2009, Robinson College, Cambridge, UK**

**MONDAY 13<sup>th</sup> JULY 2009**

8.00	Registration – Auditorium Foyer
<b>Panel Discussion: World Trade Centre</b> <b>Panel Chair: James P. Colgate, New York City Department of Buildings</b> Presentations Of And Discussions On The Findings Of The Three Major WTC Research Studies	
09.30	Chairmans Introduction: James P. Colgate, Assistant Commissioner (TACD), New York City Department of Buildings, USA
10.00	<b>Project Group 1:</b> <b>Federal investigation of the evacuation of the World Trade Center on September 11, 2001</b> <i>Jason Averill, R Peacock, E Kuligowski, R Reneke, National Institute of Standards and Technology, D Mileti, University of Colorado, N Groner, John Jay College, H Nelson, Independent Consultant, USA and G Proulx, National Research Council Canada, Canada</i>
10.30	Refreshment Break
11.00	<b>Project Group 2:</b> <b>The World Trade Center evacuation study: Factors associated with evacuation time and injury</b> <i>Robyn Gershon, Columbia University, USA</i>
11.30	<b>Project Group 3:</b> <b>The UK WTC 9/11 evacuation study: An overview of the methodologies employed and some analysis relating to fatigue, stair travel speeds and occupant response times</b> <i>Edwin Galea, Lynn Hulse, Rachel Day, Asim Siddiqui, Gary Sharp, University of Greenwich, UK</i>
12.00	Open Panel Discussion
12.30	Lunch – Garden Restaurant
<b>Fire Safety Design And Evacuation Issues Associated With Tall Buildings</b> <b>Chair: Mark Chubb</b>	
13.45	<b>Selecting appropriate evacuation strategies for super tall buildings: Current challenges and needs</b> <i>Jeffrey Tubbs, Arup and Brian Meacham, Worcester Polytechnic Institute, USA</i>
14.05	<b>A study on high rise building fire evacuation strategies for Taipei 101 Financial Centre</b> <i>Kuang-Hua Hsiung, Fire Department of Taipei City, Shen-Wen Chien, Po-Ta Huang, Central Police University and Chiung-Hsuan Tseng, Fire Department, Taoyuan County, Taiwan</i>
14.25	<b>A situation awareness requirements analysis for the use of elevators during fire emergencies</b> <i>Norman Groner, John Jay College, City University of New York, USA</i>
14.45	Discussion
15.00	Refreshment Break
15.30	<b>Lifts for evacuation – Human behaviour considerations</b> <i>Emma Heyes, Arup Fire, Australia and Michael Spearpoint, University of Canterbury, New Zealand</i>
15.50	<b>Investigating the use of elevators for high-rise building evacuation through computer simulation</b> <i>Michael Kinsey, Edwin Galea, Peter Lawrence, University of Greenwich, UK</i>
16.10	Discussion
16.25	<b>Discussion Panel: Elevators for Evacuation</b> <b>Panel Chair: Guylene Proulx NRC, Canada</b> The use of elevators or lifts as a means of escape from fire is gaining acceptance around the world. Some buildings are equipped with elevators/lifts for building evacuation in an emergency e.g. the Stratosphere Tower in Las Vegas, the Shard in London and the Eureka Hotel in Melbourne. However several contentious issues remain unresolved. This Discussion Panel will address these issues.; <b>Panel Members:</b> Jason Averill, NIST; Emma Heyes, ARUP; Glen Hedman, UIC; Jake Pauls, Consultant; David McColl, OTIS; Peter Johnson, ARUP.
18.00	Close
18.45	Welcome Reception, College Gardens

## TUESDAY 14<sup>TH</sup> JULY

8.00	Day delegate registration – Auditorium Foyer	
	<b>Evacuation by means of stairs and/or escalators - related issues</b> <b>Chair: Ed Galea</b>	<b>Evacuation Dynamics - Experimental and simulation studies</b> <b>Chair: Ai Sekizawa</b>
9.00	<b>Experimental studies to investigate merging behaviour in a staircase</b> <i>Karen E Boyce, Jim Shields, University of Ulster and David Purser, Hartford Environmental Research, UK</i>	<b>A comprehensive modern approach to developing evacuation data capture/analysis and simulation tools for real world fire engineering</b> <i>Shrikant Sharma, V Tabak, D Brocklehurst, Buro Happold Ltd and A Sagun, D Bouchlaghem, Loughborough University, UK</i>
9.20	<b>Analysis on occupants' escape speed and reason of bottle-neck occurrence through the trial evacuation experiment at a high-rise apartment housing</b> <i>Jun-ho Choi, Hyun-seung Hwang, Won-hwa Hong, Yeol. Choi, Kyungpook National University, Korea</i>	<b>Evacuation in complex environments – an analysis of evacuation conditions in a nuclear power plant and a tunnel construction site</b> <i>Håkan Frantzich, Daniel Nilsson, Lund University, Sweden</i>
9.40	<b>Who defers to whom? Deference behaviour on stairs</b> <i>Marie Melly, Patrick Lennon, Ruth Lennon, Letterkenny Institute of Technology, Ireland</i>	<b>Hotel evacuation at night; an analysis of unannounced fire drills under various conditions</b> <i>Margrethe Kobes, Netherlands Institute for Safety and VU University Amsterdam, Nancy Oberijé, Karin Groenewegen, Netherlands Institute for Safety, Ira Helsloot, VU University Amsterdam and Bauke de Vries, Eindhoven University of Technology, The Netherlands</i>
10.00	<b>Implications of modelling and experimental studies of evacuation behaviour on stairs for multistorey building design</b> <i>David Purser, Hartford Environmental Research and Karen Boyce, FireSERT, University of Ulster, UK</i>	Evacuation of a cinema auditorium with mobility disabled persons in public <i>Manuela Tancogne-Dejean, H Colina ATILH and K Van Niel, D Ilsbrock, LCPP, France</i>
10.20	Discussion	Discussion
10.40	Refreshment Break	Refreshment Break
	<b>Chair: Rita Fahy</b>	<b>Chair: Hakan Frantzich</b>
11.10	<b>Feasibility of upward evacuation by escalator – An experimental study</b> <i>Naoko Okada, Yuji Hasemi, Shuji Moriyama, Kazutaka Hirakawa, Kota Takemori, Takahiro Hebiishi, Yunqin Lu, Waseda University, Japan</i>	<b>A study on evacuation of school buildings for elementary education</b> <i>Rosaria Ono, University of São Paulo and Marcos Vargas Valentin, Valentin Arquitetura, Brazil</i>
11.30	<b>Extended model of pedestrian escalator behaviour based on data collected within a Chinese underground station</b> <i>Michael Kinsey, Edwin Galea, Peter Lawrence, University of Greenwich, UK</i>	<b>Pre-school and school children building evacuation</b> <i>V Kholoshevnikov, State Moscow University of Civil Engineering and D Samoshin, A Parfenenko, Academy of State Fire Service of Russia, Russia</i>
11.50	<b>Study on availability and issues of evacuation using stopped escalators in a subway station</b> <i>Hiroyuki Kadokura, Tokyu Research Institute, Inc, Ai Sekizawa, University of Tokyo, Wataru Takahashi, ING Co Ltd, Japan</i>	<b>Evacuation from a single family house</b> <i>Guyllène Proulx, National Research Council Canada, Canada</i>
12.10	Discussion	Discussion
12.25	Lunch – Garden Restaurant	
13.40	<b>Poster Session I</b> Umney Theatre Foyer	

	<b>Visibility and Effectiveness of Signage in Degrading Environments</b> <b>Chair: Guylene Proulx</b>	<b>Evacuee Behaviours and experiences in real fires</b> <b>Chair: Jason Averill</b>
14.30	<b>Simulation of perceived visibility in smoke laden environment</b> <i>Qihui Zhang, Philip Rubini, University of Hull, UK</i>	
14.50	<b>Modelling the visibility of emergency signs in smoke and smoke-free conditions</b> <i>Volker Schneider, IST GmbH, Germany</i>	<b>Fire in an operating theatre what really happens? A case study of a fire in a private hospital in Hamilton, New Zealand</b> <i>Debbie Scott, OnFire Consulting Ltd, New Zealand</i>
15.10	<b>Experimental study of the effectiveness of emergency signage</b> <i>Hui Xie, Lazaros Filippidis, Edwin Galea, Darren Blackshields, Peter Lawrence, University of Greenwich, UK</i>	<b>An analysis of the response behaviours of the evacuees of WTC1 on 9/11</b> <i>N McConnell, Queens University Belfast, K Boyce, J Shields, FireSERT, University of Ulster, UK</i>
15.30	<b>Calculating methods of evacuee's behavior based on the floor illuminance in fire smoke estimated by two layer zone mode</b> <i>Yuki Akizuki, University of Toyama, Naoya Hara, Kansai University and Takeyoshi Tanaka, Kyoto University, Japan</i>	<b>Fire in Euroborg Football Stadium; Analysis of human behaviour</b> <i>Nancy Oberijé, Margrethe Kobes, Jans Weges, Jos Post, Netherlands Institute for Safety (NIFV), The Netherlands</i>
15.30	Discussion	Discussion
15.50	Refreshment Break	Refreshment Break
16.15 – 17.15	<b>Posters Session II</b> Dining Room Balcony	
18.30	Conference Dinner and Reception – College Dining Hall	

## WEDNESDAY 15<sup>TH</sup> JULY

8.00	Day Delegate Registration – Auditorium Foyer	
	<b>Populations at Greater Risk from Fire</b> <b>Chair: Rosario Ono</b>	<b>Emergency Planning and Decision Making</b> <b>Chair: Karen Boyce</b>
8.50	<b>Community based research on the effectiveness of the home smoke alarm in waking up children</b> <i>Dorothy Bruck, Ian Thomas, Victoria University, Australia</i>	<b>How well will your emergency plan work? – A technique to assess human errors and human behaviour in emergency response</b> <i>S Y Zachary Au, Human Interactions Limited, UK</i>
9.10	<b>Behaviour, fire and older people: Implications of the demographic growth of a vulnerable population</b> <i>Ian Miller, Heimdall Consulting Ltd, New Zealand</i>	<b>On-line information and decision-support in building egress</b> <i>Elise Miller-Hooks, University of Maryland, USA</i>
9.30	<b>Sleep inertia in the context of emergency evacuation: a review of what we do and do not know</b> <i>Dorothy Bruck, Melanie Tokley, Victoria University, Australia</i>	<b>Application of adaptive management concepts to building evacuation and emergency response</b> <i>Brian Meacham, Worcester Polytechnic Institute, USA</i>
9.50	Discussion	Discussion
10.05	Refreshment Break	Refreshment Break
	<b>Occupant Responses to Fire Stimuli</b> <b>Chair: Ian Thomas</b>	<b>Towards Performance Based Human Behaviour In Fire Safety Engineering</b> <b>Chair: David Charters</b>
10.30	<b>The use of auditory, tactile and visual alarm signals: A focus on the effectiveness of light</b> <i>Michelle Ball, Dorothy Bruck, Ian Thomas, Victoria University, Australia</i>	<b>A review of the sources of occupant performance data used in building evacuation models</b> <i>Rani Kady, Old Dominion University, Steve Gwynne, Hughes Associates and Jerry Davis, Auburn University, USA</i>
10.50	<b>Adapting the road tunnel safety devices to the users</b> <i>Marc Tesson, Sylvie Lavedrine, Tunnel study centre (CETU) and Laurent Baudet, DIRIF, France</i>	<b>The standardization of human egress data</b> <i>Steven Gwynne, Hughes Assocs Inc, USA</i>

11.10	<b>'Panic' and human behaviour in fire</b> <i>Rita Fahy, National Fire Protection Association, USA, Guylène Proulx, National Research Council of Canada, Canada and Lata Aiman, Deakin University, Australia</i>	<b>The use of experts for predicting human behaviour in fires</b> <i>Glyn Lawson, Sarah Sharples, David Clarke, Sue Cobb, The University of Nottingham, UK</i>
11.30	<b>A survey of the characteristics of human evacuation behaviours in building fires</b> <i>Wei-wen Tseng, Tzu-sheng Shen, Chien-wen Liang, Central Police University, Taiwan</i>	<b>Implementation of cognitive mapping, spatial representation and wayfinding behaviours of people within evacuation modelling tools</b> <i>Anand Veeraswamy, Peter Lawrence, Edwin Galea, University of Greenwich, UK</i>
11.50	<b>Is consideration of evacuation relevant to most fire fatalities? Using the CESARE Coronial Database to investigate the utility of ASET/RSET calculations</b> <i>Ian Thomas, Dorothy Bruck, Michelle Barnett, CESARE, Victoria University, Australia</i>	<b>A risk contour based methodology towards improving the validity of RSET estimations in ASET/RSET evaluations</b> <i>Mahmut Horasan, Scientific Fire Services Pty Ltd, Australia</i>
12.10	<b>An investigation of passenger exit selection decisions in aircraft evacuation situations</b> <i>Madeleine Togher, Edwin Galea, Peter Lawrence, University of Greenwich, UK</i>	<b>Complex systems – a holistic approach for understanding and modeling fire evacuation behaviour</b> <i>Daniel Nilsson, H Frantzich, Lund University and C Uhr, Swedish Rescue Services Agency, Sweden</i>
12.30	Discussion	
13.00	Lunch – Garden Restaurant	
14.10	<p style="text-align: center;"><b>Informed Emergency Responses through Improved Situation Awareness</b> <b>Discussion Panel</b> <b>Chair: Jake Pauls, Consultant</b></p> <p>Situation Awareness is being aware of what is happening around you and understanding what information is available and what that information actually means to the present and especially in a developing emergency. Situation awareness is not new in the field of human behaviour in fire. Serious failures in situation awareness have been identified as central to unfortunate outcomes in several emergencies eg World Trade Center 2001. It is apparent that greater attention must be paid by all concerned with fire safety in the development of future strategies and tactics to achieve reasonable fire and life safety in buildings and other structures.</p> <p><b>Panel members :</b> Norman Groner, John Jay College of Criminal Justice; Steve Gwynne, Hughes Associates; Erica Kuligowski, NIST; Brian Meacham, Worcester Polytechnic Inst, Guylene Proulx, National Research Council; Ian Thomas, Victoria Univ</p>	
15.45	<b>Closing Remarks: Jim Shields (Symposium Chair)</b>	
16.00	Close and refreshments	

## **POSTERS Session I (Tuesday 13.40-14.30)**

### **Simulation of human movement by cellular automata models using different update schemes**

*Christian Rogsch, University of Wuppertal, A Schadschneider, University of Cologne, A Seyfried, Forschungszentrum Jülich GmbH, Germany*

### **Simulating building evacuation using an agent based approach**

*Nate Wittasek, Arup, USA*

### **Flow-based microsimulation of evacuation processes**

*Nick Waterson, Mott MacDonald Ltd/Imperial College London, S Le Bail, Mott MacDonald Ltd and B V H Boulanger, Imperial College London, UK*

### **Sensor-linked simulation for emergency response**

*Jeremy Fraser-Mitchell, BRE Global and Sung-Han Koo, Stephen Welch, The University of Edinburgh, UK*

### **Introducing pathfinder: An agent-based egress simulator**

*Charlie Thornton, Richard O'Konski, Brian Hardeman, Thunderhead Engineering Consultants, Inc., USA*

### **Comparison of two egress models and a full-scale experiment**

*Bjørn Christoffersen, AK83, Consulting Architects and Christina Söderlind, ALECTIA A/S, Denmark*

**An experimental study on the evacuation flow of crowd including wheelchair users**  
*Taku Shimada, Akeno Fire Research Institute and Hideo Naoi, Tokyo University of Science, Japan*

**Assessment of human behavior parameters used in performance-based design approaches for different building use groups**  
*Alberto Alvarez, Brian Meacham, Worcester Polytechnic Institute, USA*

**Risk Factors For Residential Fire Fatality Across The Lifespan: Comparing Coronal Data For Children, Adults, And Elders**  
*Helen Graesser, Michelle Ball, & Dorothy Bruck, Victoria University, Centre for Environmental Safety and Risk Engineering (CESARE), Australia*

**A study on the adaptive guidance-system and the evacuation experiments for simulation model**  
*Hidekazu Kakei, The University of Tokushima, Toshihiko Sako, Tomonori Sano, Waseda University and Hiroomi Sato, ERS Corp., Japan*

## **POSTER Session II (Tuesday 16.15 – 17.15)**

**Evacuation for tall buildings in Hong Kong**  
*Kendrew Ng, W Chow, The Hong Kong Polytechnic University, China and C Chow, University of Cambridge, UK*

**Study on the changes of evacuation performance in the staircase of high-rise building**  
*Gyuyeob Jeon, Kyungpook Nat'l University, South Korea*

**Stair descent devices: An overview of current devices and proposed framework for standards and testing**  
*Glenn Hedman, University of Illinois at Chicago, USA*

**Dimensioning stairs and door widths for Dutch building regulations**  
*Peter van de Leur, B Peters, M Haas, DGMR Consulting Engrs Bouw b.v., The Netherlands*

**Human behaviour in tunnel accidents**  
*Silke Eder, Johanna Brutting, Andreas Muhlberger, Paul Pauli, University of Wurzburg, Germany*

**An evacuation simulation method for a high speed passenger train**  
*Jorge Capote, Daniel Alvear, Orlando Abreu, Mariano Lázaro, Arturo Cuesta, University of Cantabria, Spain*

**Experiments of the subway car egress**  
*Jong-Hoon Kim, Woon-Hyung Kim, Kyungmin College, Sam-Kew Roh, Kwangwoon University and Duck-Hee Lee, Woo-Sung Jung, Korea Railroad Research Institute, Korea*

**School bus evacuation: Research to practice**  
*Rani Kady, Old Dominion University and Korrie Allen, Eastern Virginia Medical School, USA*

**Human behavior AND fire: A renewed paradigm for fire safety engineering**  
*Vincent Brannigan, University of Maryland, USA*

**The process of human behavior in fires**  
*Erica Kuligowski, National Institute of Standards and Technology, USA*

**An analysis of fires with mass life losses in Russian federation and recommendation for its prevention**  
*V Kholoshevnikov, State Moscow University of Civil Engineering and D Samoshin, I Belosokhov, Academy of State Fire Service of Russia, Russia*

**Occupant response and evacuation at the Station Nightclub fire: An analysis of witness statements**  
*Rita Fahy, National Fire Protection Association, USA and Gylène Proulx, National Research Council of Canada, Canada*

**Crowd pressure against fixed walls of experimentally overcrowded area and its effect on human body**  
*Hidemasa Yoshimura, Osaka Inst of Technology, Japan*

**An evaluation of firefighting and evacuation lifts: Exploring the concept of using lifts to escape buildings**  
*Peter Sumner, WSPG Group, UK*

***The Programme is correct at time of print but the organisers reserve the right to make changes as necessary***