AOSFST 2024
13th Asia-Oceania Symposium on Fire Science and Technology

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13th Asia-Oceania Symposium on Fire Science & Technology 2024

October 21–25, 2024
Hotel Susung, Daegu, Republic of Korea

Program Book

Korean Institute of
Fire Science & Engineering

Asia-Oceania Association for
Fire Science and Technology

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Overview of

AOSFST 2024

13th Asia-Oceania Symposium on Fire Science and Technology

Event	13th Asia-Oceania Symposium on Fire Science and Technology (AOSFST 2024)
Date	October 21-25, 2024
Venue	Hotel Susung, Daegu, Republic of Korea
Organized by	Korean Institute of Fire Science & Engineering Asia-Oceania Association for Fire Science and Technology
Supported by	DAEGU 대구광역시 DAEGU METROPOLITAN CITY KOREA TOURISM ORGANIZATION exco

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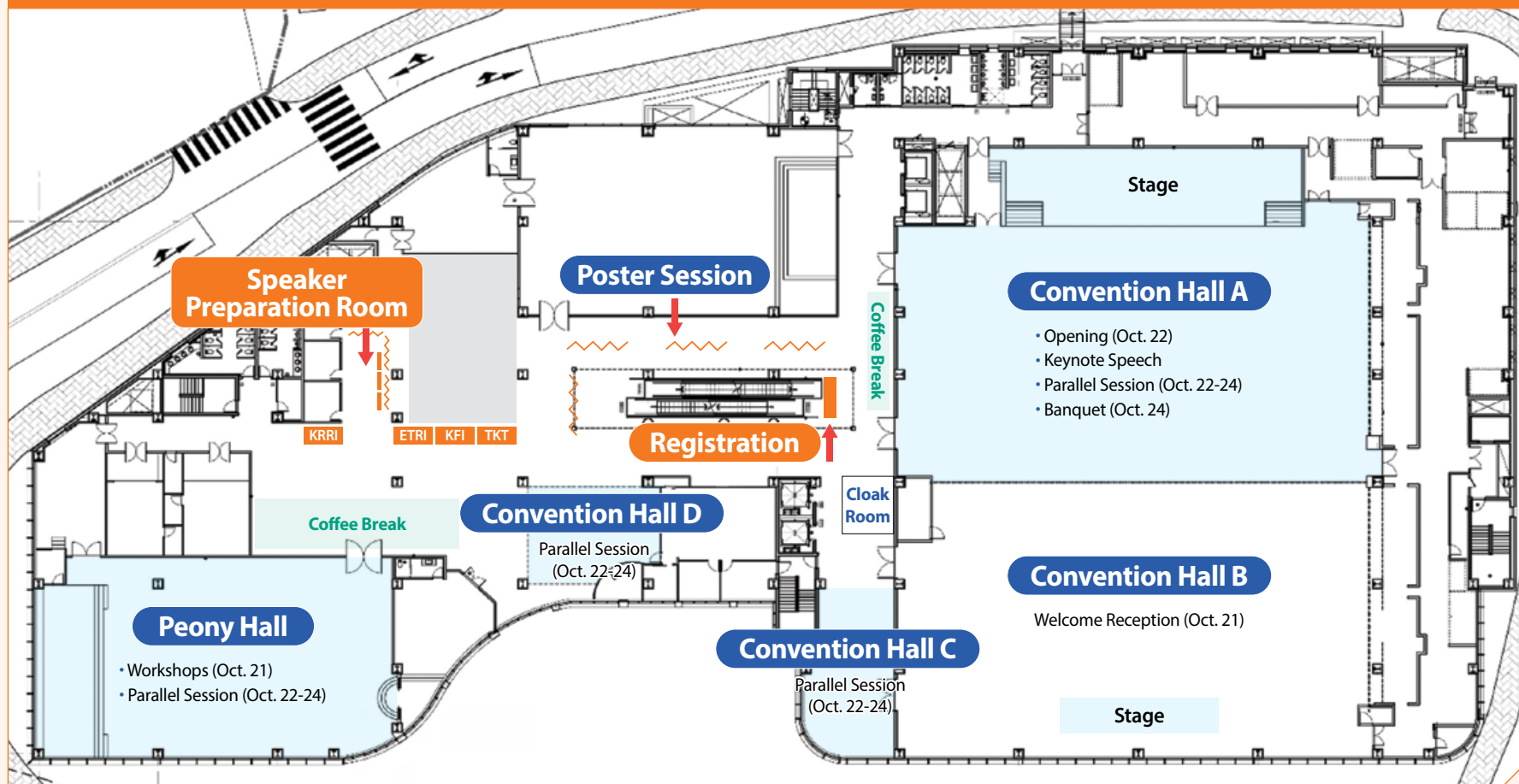
Silver

KFI Korea Fire Institute

TKT TANKTECH

Bronze

Korea Fire Facility Association

Delegate Bag

KFPA KOREAN FIRE PROTECTION ASSOCIATION

Speaker Preparation Room

KRRI ETRI KFI TKT

Poster Session

Coffee Break

Registration

Convention Hall A

- Opening (Oct. 22)
- Keynote Speech
- Parallel Session (Oct. 22-24)
- Banquet (Oct. 24)

Stage

Cloak Room

Coffee Break

Convention Hall D

Parallel Session (Oct. 22-24)

Convention Hall B

Welcome Reception (Oct. 21)

Peony Hall

- Workshops (Oct. 21)
- Parallel Session (Oct. 22-24)

Convention Hall C

Parallel Session (Oct. 22-24)

Stage

W.K. Chow JP FHKEng

- President
  Asia-Oceania Association for Fire Science and Technology

It is my greatest pleasure to see that the 13th Asia-Oceania Symposium on Fire Science and Technology will be held in Korea from 21 to 25 October 2024. I would like to express my sincere gratitude to all the guests of honour, invited speakers and participants from different countries for attending this symposium.

Special thanks are due to all the chairmen, committee members, technical committee members and reviewers for their hard work and effort, including Professor Jun-Ho Choi, Professor Kazunori Harada, Professor Naian Liu, Professor Guan-Yuan Wu and Professor Longhua Hu for hosting the conference and organizing different committees.

Again, there will be plenary and invited lectures, oral presentations and poster presentations, as in the past years. There will also be a technical laboratory tour on 25 October 2024.

Since the first AOSFST held in 1992, this traditional event is held every two or three years, organized by the Asia-Oceania Association for Fire Science and Technology (AOAFST). However, normal professional activities were affected for almost four years due to lockdown. It is great that we have this symposium organized so good by the Korean host in this year.

I hope you will find it a valuable experience attending the symposium and wish you a wonderful time in the fast-growing modern city Daegu.

Jun-Ho CHOI, Ph.D.

- Professor, Pukyong National University, South Korea
- The Chairman of Local Organizing Committee, AOSFST 2024
- Vice-president of Korea Institute of Fire Science and Engineering (KIFSE)

안녕하세요? Hello, 您好! こんにちは。 I am Professor CHOI Jun-Ho (최준호, 崔俊鎬) from Pukyong National University and the Local Organizing Committee Chairman for the 13th Asia-Oceania Symposium on Fire Science and Technology (AOSFST 2024). It is a pleasure to welcome you to Daegu for our symposium, returning here after 20 years since the 6th symposium.

I would like to extend my sincere gratitude to the many local committee members, including President Lee Seung-Cheol of the Korean Institute of Fire Science and Engineering (KIFSE, 韓國火災消防學會), as well as the public institutions and companies that have generously sponsored this event. I also apologize for any inconvenience caused to participants due to scheduling issues or delayed responses during the preparation process.

We are living in an era where fire safety is of paramount importance. In South Korea, significant research has been conducted following major fire disasters such as the Daeyeongak Hotel fire in 1971 and the Daegu subway fire in 2003. I am honored to host a symposium that serves as a platform for sharing these academic findings with researchers from around the globe, particularly from Asia and Oceania, and fostering opportunities for collaboration.

A total of 199 manuscripts were received for this symposium, including 143 oral presentations and 56 poster presentations. This response reflects our eagerness for an international symposium after the COVID-19 pandemic. Thank you once again.

Currently, many countries are facing a decline in the number of graduate students and researchers due to economic recession and population decline, which poses a serious challenge. While the demand for fire safety expertise continues to grow, I am increasingly concerned about the shortage of qualified researchers and engineers in this field. Through our symposium, we aim to generate greater interest in fire safety science and technology across the Asia and Oceania regions, contributing to a safer world.

Once again, I would like to express my heartfelt gratitude to everyone who worked tirelessly to ensure the success of our symposium. I hope you find the event enjoyable, facilitating both academic and personal exchanges while experiencing the culture of Korea and Daegu. Thank you.

Seung-Chul Lee

- President, Korean Institute of Fire Science & Engineering (KIFSE)
- Professor, Kangwon National University, Republic of Korea

Distinguished attendees of AOSFST 2024,

It is my great pleasure to welcome you all to the 13th Asia-Oceania Symposium on Fire Science and Technology, held in Daegu, Korea. I am truly honored to have you with us as we gather to discuss the latest advancements in fire safety and technology.

The Korean Institute of Fire Science & Engineering has been a leading academic organization in the field of fire safety in South Korea for 37 years, since its founding in 1987. Our institute has built the academic foundation in fire safety and has greatly contributed to the growth and development of the fire safety industry. We are also actively involved in creating and updating various policies, playing a key role in making Korea a safer place. Through these efforts, we are helping to achieve "SAFE KOREA", a country protected from the threat of fire.

This symposium reflects our strong commitment to fostering international cooperation and advancing fire safety technologies, both in Korea and globally. As fire safety challenges grow with urbanization and industrial development, it is essential for us to work together across borders. By sharing knowledge and exchanging ideas here, we can develop innovative solutions that address these shared challenges.

I would like to extend my sincere thanks to all participants and organizers for their efforts in making this symposium a success. I wish you all a productive and insightful symposium.

AOSFST 2024
13th Asia-Oceania Symposium on Fire Science and Technology

AOSFST 2024 — Program At a Glance

Time	October 21 (Mon) Peony Hall	October 22 (Tue) Convention A	Convention D	Peony Hall	Convention C	October 23 (Wed) Convention A	Convention D	Peony Hall	Convention C	October 24 (Thu) Convention A	Convention D	Peony Hall	Convention C	October 25 (Fri)
08:00-09:00		Registration				Registration				Registration				
09:00-10:30		Opening & Keynote 1, Keynote 2				Keynote 3 & 4				[F-3] Wildland and Outdoor Fires	[H-4] Fire Risk Analysis and Safety Design	[B-4] Structure in Fire	[E-4] Emerging Issues	Technical Tour
10:30-10:50		Coffee Break				Coffee Break				Coffee Break				
10:50-12:10		[C-1] Evacuation and Human Behaviour	[B-1] Structure in Fire	[A-1] Material Flammability, Toxicity, and Related Testing Method	[J-1] Flame Dynamics	[E-2] Emerging Issues	[F-2] Wildland and Outdoor Fires	[A-2] Material Flammability, Toxicity, and Related Testing Method	[H-2] Fire Risk Analysis and Safety Design	[J-2] Flame Dynamics	[E-3] Emerging Issues	[G-3] Enclosure Fire Dynamics	AOAFST Board Meeting/Award Commiitee Meeting	
12:10-13:30	Registration	Lunch Break				Lunch Break				Lunch Break				
13:30-15:00	Workshop Ⅰ Lithium-Ion Battery Fire Safety	[D-1] Fire Spread	[E-1] Emerging Issues	[F-1] Wildland and Outdoor Fires	[I-1] Fire Suppression	[B-2] Structure in Fire	[H-3] Fire Risk Analysis and Safety Design	[D-3] Fire Spread	[G-2] Enclosure Fire Dynamics	[B-3] Structure in Fire	[A-3] Material Flammability, Toxicity, and Related Testing Method	[J-3] Flame Dynamics	Void	
15:00-15:30	Break	Coffee Break				Coffee Break				Coffee Break				
15:30-17:00	Workshop Ⅱ Diversity Equity Inclusion Committee	[G-1] Enclosure Fire Dynamics	[H-1] Fire Risk Analysis and Safety Design	[C-2] Evacuation and Human Behaviour	[D-2] Fire Spread	Poster Session				Void	[C-3] Evacuation and Human Behaviour	[I-2] Fire Suppression	[J-4] Flame Dynamics	
17:00-18:00	Break/AOAFST Board Meeting													
18:00-20:00	Welcome Reception									Banquet				

AOSFST 2024 Scientific Program

October 21st (Monday)

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
12:00-13:30	Registration (Lobby, 3F)			
13:30-15:00	Workshop Ⅰ (Peony Hall) Lithium-Ion Battery Fire Safety by Dr. Kim Hyung-Jun from Korea Conformity Laboratories (KCL), KOREA			
15:00-15:30	Coffee Break			
15:30-17:00	Workshop Ⅱ (Peony Hall) Diversity Equity Inclusion Committee by Prof. Miho Seike from Hiroshima University, JAPAN, Yuxin Zhang from Hong Kong Politech University, HONG KONG, CHINA			
17:00-18:00	Hotel Check-in & Break			AOAFST Board Meeting
18:00-20:00	Welcome Reception (Convention Hall B)			

October 22nd (Tuesday)

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
08:00-09:00	Registration (Lobby, 3F)			
09:00-09:30	Opening Ceremony (Convention Hall A)			
09:30-10:00	Keynote Speech Ⅰ (Convention Hall A) Jun-Ho Choi (Pukyong National University, KOREA) Flow Properties of Fire-induced Thermal Currents Prof. Yasushi Oka, Yokohama National University, JAPAN			
10:00-10:30	Keynote Speech Ⅱ (Convention Hall A) Jun-Ho Choi (Pukyong National University, KOREA) Pedestrian and Evacuation Dynamics Prof. Weiguo Song, University of Science and Technology of China, CHINA			
10:30-10:50	Coffee Break			
10:50-12:10	Session C-1: Evacuation and Human Behaviour	Session B-1: Structure in Fire	Session A-1: Material Flammability, Toxicity, and Related Testing Method	Session J-1: Flame Dynamics
Chair	Young-Chan Kim (Dongguk Univeristy, KOREA)	Min Jae Park (Pukyong National University, KOREA)	Amit Saxena (Indian Government, INDIA)	Xu Wen (University of Science and Technology of China, CHINA)
10:50-11:10	EvacUnet: A Deep Learning-Based Evacuation Analysis Method for Assisting Fire Safety Mingyu Du, Ruolong Yi, Jun Zhang and Weiguo Song, University of Science and Technology of China, CHINA	Numerical Analysis Study on Membrane Action focusing on Differences in the Direction of Unprotected Secondary Beams in a Composite Flooring System Exposed to Fire Kisei Shimono, Haruka Kanada, Moe Horie, Takeo Hirashima, Kei Kimura and Yusuke Shintani, Chiba University, JAPAN	Fabrication of Organophosphate-grafted Mica for Enhancing The Fire Protection, Smoke Suppression and Anti-Ageing Properties of Amino Transparent Fire-Retardant Coatings Xiaojiang Xie, Zhisheng Xu and Long Yan, Central South University, CHINA	Experimental Flame Dynamics Study of Pressurized Hydrogen Jet Fires Yoon Ko and Dana Duong, National Research Council Canada (NRCC), CANADA
11:10-11:30	Analysis of Evacuation Scenarios for Elderly Workers in the Workplace: A Case Study of Factory C in Tainan, Taiwan Tzushan Hsu, Shiuancheng Wang, Liangsheng Wu, Shaochen Hsu and Chunghwei Su, National Kaohsiung University of Science and Technology, TAIWAN	Analysis of Fire Resistance Performance of Fire Doors Using Thermo-mechanical Model Depending on Gap Size Bohyuk Lim, Seunggeun Lee, Donghwan Cho, Heedu Lee, Joowon Lee, Haeyeol Lee and Minkoo Kim, Chungbuk National University, KOREA	Effect of Top-layer Glass on Reaction-to-fire Characteristics of BIPV Panels and the Limitations of ISO 5660-1 Methodology Jung-min Choi, Kye-Won Park, Ga-young Yoon and Seong-Kyun Im, Fire Insurers Laboratories of Korea (FILK), KOREA	Evaluating Layer Spacing on Combustion Characteristics and Flame Morphological Evolution of Double-layer Cable Fires in Urban Utility Tunnels Desheng Xu, Yanfeng Li, Junmei Li, Hua Zhong, Jiaxin Li and Youbo Huang, Beijing University of Technology, CHINA

Time				
11:30-11:50	**Development of a Framework to Research Evacuation Wayfinding Using Virtual Reality** Xian-Jun Li and Young-Chan Kim, Dongguk University-WISE, KOREA	**Finite Element Modeling of The Behavior of Concrete-filled Steel Tube Columns at Elevated Temperatures** Van Lanh Le, Chang Hwan Lee and Min Jae Park, Pukyong National University, KOREA	**Performance Evaluation of the Mock-up Fire Tests on Exterior Wall Composite Finishing Materials** Kyeongsin Kang, Seungun Chae, Jaesung Lee, Sungyool Bong and Jisun You, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA	**Experimental Study on the Effect of the Ignition Location on Vented Deflagration of Hydrogen–air Mixtures in Enclosure** Unggi Yoon, Byoungjik Park, Inju Hwang, Wookyung Kim and Yangkyun Kim, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA
11:50-12:10	**Luminous Flux Transfer from Multiple Light Sources Considering Scattering in Smoke Layer** Daisaku Nii, Tetsu Oto, Kazunori Harada and Anyang Sun, Kyoto University, JAPAN	**Temperature Profile of Steel-Plate Composite Wall (SC Wall) Under Standard Fire** Myeong Hoo Jeong, Chang-Hwan Lee and Min Jae Park, Pukyong National University, KOREA	**Sucrose Based Environmentally Suitable Aerosol Forming Composite for Fire Extinguishing Applications** Amit Saxena, Braham Prakash, Yogesh Tyagi, Kavita Devi, Inderpal Singh and Arvind Kumar, Centre for Fire, Explosive and Environment Safety, Indian Government, INDIA	**Flamelet LES of Turbulent Pool Fires Considering Differential Diffusion** Yunxiao Yan and Xu Wen, University of Science and Technology of China (USTC), CHINA
12:10-13:30	Lunch Break			
13:30-15:10	Session D-1: Fire Spread	Session E-1: Emerging Issues	Session F-1: Wildland and Outdoor Fire	Session I-1: Fire Suppression
Chair	Takuya Yamazaki (Toyohashi University of Technology, JAPAN)	Cheol-Hong Hwang (Daejeon University, KOREA)	Weiguo Song (University of Science and Technology of China, CHINA)	Xishi Wang (University of Science and Technology of China, CHINA)
13:30-13:50	**Experimental Study of Horizontal Seismic Effect on Upward Turbulent Flame Spread** Tzu-Yan Tseng and Kuang-Chung Tsai, National Kaohsiung University of Science and Technology, TAIWAN	**Development of a Robust Early-Stage Thermal Runaway Detection Model for Lithium-ion Batteries** Wai Cheong Tam, Jian Chen, Wei Tang, Qi Tong, Jun Deng, Hongqiang Fang and Anthony Putorti Jr., National Institute of Standards and Technology (NIST), USA	**The Influence of COVID-19 Alcohol Ban on Residential Fires in Cape Town, South 1 Africa** Natalia Flores Quiroz and Richard Walls, Stellenbosch University, SOUTH AFRICA	**Numerical Study on Smoke Blocking of Tunnel Fires by Water Mist Curtain Based on New Nozzle** Wei Zhong, Zhanming Zhang, Yu Hou, Tianshui Liang, Zhenzhen Wang and Xiaolei Gao, Zhengzhou University, CHINA
13:50-14:10	**A Study on Fire Spread Behavior on Plywood Walls of Various Thickness** Masato Komiya, Kazunori Harada and Daisaku Nii, General Building Research Corporation of Japan, JAPAN	**Experimental Study on the Thermo-Physical Behaviour of a Lithium-Ion Pouch Battery** Kwangho Son, Sungwook Kang, Minjae Kwon, Joungyoon Choi and Sengkwan Choi, Ulster University, UK	**On the Design of a Firebrand Generator** Jiann Yang, National Institute of Standards and Technology (NIST), USA	**Effect of Water Mist Characteristics on Electrical Insulation During Electric Cable Fire** Jihyun Kwark, Fire Insurers Laboratories of Korea (FILK), KOREA
14:10-14:30	**Full-Scale Experiments on Fire Spreading Behavior in a Room with Various Wooden Interiors** Masaki Noaki, Jun-Ichi Yamaguchi, Kei Aoki and Yoshifumi Ohmiya, Building Research Institute, JAPAN	**A Generic Flashover Prediction Model Based on Spatio-Temporal Graph Attention Networks** Linhao Fan, Hongqiang Fang, Bing Zhang, Wai Cheong Tam and Tianshui Liang, University of Science and Technology of China, CHINA	**Influence of Structural Dimensions and Ambient Wind on Building Facade Fire Spread in the Street Canyon in Old Blocks** Jia Gui, Sichuan Tianfu New Area Urban Construction Bureau, Chengdu Local Government, CHINA	**Assessing the Tenability Conditions in Mixed-use Building Fires under the Effects of Fire Suppression System and Fire Exit Door** Guan-Yuan Wu and Yi-Wei Su, Central Police University, TAIWAN
14:30-14:50	**Self-Extinction of Wood Plate: Effect of Fuel Thickness and Flame Spread Orientation** Yili Hu, Supan Wang, Yanhui Liu and Xinyan Huang, Nanjing Tech University, CHINA	**A Study on Evacuation Experiments Using Augmented Reality Devices** Yeong Geol Lee, Duckhee Lee, Won-Hee Park, Tae-Soon Kwon, Soo-hwan Yun and Min Seok Oh, Korea Railroad Research Institute, KOREA		**Evaluation of a Fire Protection Network (FPN) Model Using Open Top Combustible Containers** Dong Han, James White and Yibing Xin, FM Global, USA
14:50-15:10	**Analysis of Ignition Potential due to Contamination in Low Voltage DC PCBs** Sohee Baik, Dongyoung Lim, Seungwook Jee and Herie Park, Kangwon National University, KOREA	**A Study on the Development of Platform Based on Digital-twin for Management/control of Nuclear Power Plants** Hyeon Hyeok Yang, Min Hyeok Ko, Doo Chan Choi, Young Man Lee, Se Hun Park, Kye Won Park and Cheol Hong Hwang, KF UBIS Co. Ltd, KOREA		**Pool Fire Suppression Performance of Foams Stabilized by PPO-PEO-PPO Triblock Copolymers** Ke Qiu, Xiaoyang Yu, Qian Li and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA

15:10-15:30	Coffee Break			
Room	**Convention Hall A**	**Convention Hall D (Café)**	**Peony Hall**	**Convention Hall C (HQ)**
15:30-17:10	Session G-1: Enclosure Fire Dynamics	Session H-1: Fire Risk Analysis and Safety Design	Session C-2: Evacuation and Human Behaviour	Session D-2: Fire Spread
Chair	Xiaoyu Ju(University of Science and Technology of China, CHINA)	Young Hoon Bae (Kangwon National University, KOREA)	Guan-Yuan Wu (Central Police University, TAIWAN)	Tomohiko Imaura (Suwa University of Science, JAPAN)
15:30-15:46	**Reconstruction of a Fire Caused by a Kerosene Heater Misfueled with Gasoline** <u>Masakatsu Honma</u>, Katsuhiro Okamoto, Hiroki Yamasaki, Toshikazu Ichikawa, Daisuke Imoto, Akihiro Kawaguchi, Mitsuru Watanabe and Keisuke Ito, National Research Institute of Police Science, JAPAN	**Fire Risk Assessment of Wood Specimens coated with Clay-Silicate Mixtures** <u>Eui Jin</u> and Yeong-Jin Chung, The National Safety Environment Institute, KOREA	**Association of Walking Speed with Psychological State: An Experiment in Smoke-filled Full-scale Tunnel** <u>Wenhao Li</u>, Miho Seike, Akimasa Fujiwara, Makoto Chikaraishi, Takafumi Sasaoka and Shigeto Yamawaki, Hiroshima University, JAPAN	**Effect of Mixing Ratio on Smoldering Rate for Wood-Plastic Mixture Materials** <u>Takuya Yamazaki</u>, Daiki Matsugi and Yuji Nakamura, Hirosaki University, JAPAN
15:46-16:02	**Behavior of a Flame Front Ejected from an Open Enclosure** <u>Takashi Tsuruda</u>, Tadafumi Daitoku and Hiromi Osaka, Akita prefectural university, JAPAN	**Agreement-based Design Applying Pathetic Dot Theory to Ensure Adequate Fire Safety in a Transforming Society** <u>Yoshikazu Minegishi</u>, Building Research Institute, JAPAN	**Analysis of the Impact of Evacuation Lift Usage Variables on Required Safe Egress Time (RSET) in High-rise Buildings** <u>Ryun-Seok Oh</u>, Yu-Rim Kim, Young-Hoon Bae and Jun-Ho Choi, Pukyung National University, KOREA	**Effects of Polyester Mixing on Smoldering Spread through Cotton Wad** <u>Kosuke Ito</u> and Masataro Suzuki, Nagaoka University of Technology, JAPAN
16:02-16:18	**Experimental Study on Stratification Characteristics of Smoke in High-altitude Tunnel under Longitudinal Ventilation** <u>Yihan Chen</u>, Wenxin Zeng, Wei Tan, Yuhao Li, Chuangang Fan and Jiaqiang Han, Central South University, CHINA	**Experimental Study on Dynamic Response Performance of Hydrogen Sensor in Confined Space under Ceiling** <u>He Qize</u>, Juntao Yang, Yongfeng Zhang, Wei Wang and Jiayan Chen, Shanghai Fire Research Institute of MEM, CHINA	**Optimization of Urban Evacuation Routes for Disaster Preparedness** <u>Jun-Seok Lee</u>, Ryun-Seok Oh and Jun-Ho Choi, Pukyung National University, KOREA	**Validation of Input Parameters for a Simplified Pyrolysis Model in Fire Simulation of a Corrugated Cardboard Box** <u>Oh-Soo Kwon</u>, Ho-Sik Han and Cheol-Hong Hwang, Daejeon University, KOREA
16:18-16:34	**Experimental Study on the Temperature Distribution Characteristics under Coordinated Ventilation in Underground Interconnected Tunnel** <u>Houlin Ying</u>, Zhisheng Xu, Zihan Yu, Yaolong Ying, Shiyi Chen and Ye Xu, Central South University, CHINA	**Fire Hazard Recognition of Construction Site Workers Using Eye Trackers** <u>Young-Hoon Bae,</u> Young-Min Shin, Ryun-Seok Oh, Won-Hwa Hong and Jun-Ho Choi, Pukyong National University, KOREA	**Evacuation with Elevators – When Do They Become Essential?** <u>Leong Poon</u>, Leong Poon & Associates, MALAYSIA	**Modeling Smoldering and Flaming Combustion of Polyurethane Foam** <u>Pichayaporn Viriya-Amornkij</u> and Kazunori Kuwana, Tokyo University of Science, JAPAN
16:34-16:50			**Exploring Gender Differences in Pedestrian Behavior: A Study of Multi-directional Flow** <u>Rehmat Karim</u>, Mohsin Shaikh and Abdul Rahim Rasa, University of Science and Technology of China (USTC), CHINA	**Burning Behavior of Liquid Fuel and Burn Damage to Floorboards in Arson Cases with Liquid Fuel** <u>Katsuhiro Okamoto</u>, Hiromi Itamiaya, Hiroki Yamasaki, Mitsuru Watanabe, Keisuke Ito, Akihiro Kawaguchi, Toshikazu Ichikawa and Masakatsu Honma, National Research Institute of Police Science, JAPAN
16:50-17:10			**Analysis of Evacuation Time by Visibility for Hydrocarbon Combustibles Using Evacuation Simulation** <u>Hyun-Seok Jeong</u>, Ryun-Seok Oh and Jun-Ho Choi, Pukyong National University, KOREA	

October 23rd (Wednesday)

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
08:30-09:30	Registration (Lobby, 3F)			
09:30-10:00	Keynote Speech Ⅲ (Convention Hall A) Denvid Lau (City University of Hong Kong, China) Lithum-ion Battery Fire Safety Dr. Hyung-Jun Kim, Korea Conformity Laboratories(KCL), KOREA			
10:00-10:30	Keynote Speech Ⅳ (Convention Hall A) Denvid Lau (City University of Hong Kong, China) Fire Safe Green Facades: Development and Prospect Prof. CL Chow, City University of Hong Kong, Hong Kong, CHINA			
10:30-10:50	Coffee Break			
10:50-12:10	Session E-2: Emerging Issues	Session F-2: Wildland and Outdoor Fire	Session A-2: Material Flammability, Toxicity, and Related Testing Method	Session H-2: Fire Risk Analysis and Safety Design
Chair	Minho Seong (Pukyong National University, KOREA)	Yiren Qin (University of Maryland, USA)	Richard Kwok Kit Yuen (City University of Hong Kong, CHINA)	Yoshifumi Ohmiya (Tokyo University of Science, JAPAN)
10:50-11:10	Comparison of Temperature and Visibility in Plant Facilities Using FDS Han Bit Choi and Doo Chan Choi, KF UBIS Co. Ltd,, KOREA	Vision-Based Wildfire Detection and Spatial Positioning Method with Edge Deployment Xue Rui, Ziqiang Li, Wei Zhang, Yalin Zhang, Rui Ba, Ziyang Li and Weiguo Song, University of Science and Technology of China (USTC), CHINA	The Atomistic Pyrolysis Modelling of Flame Retarded Polymers Ivan Miguel De Cachinho Cordeiro, Anthony Chun Yin Yuen, Timothy Bo Yuan Chen and Richard Kwok Kit Yuen, City University of Hong Kong, CHINA	Evaluation of the Conspicuity of Visual Alarm Device(VAD) through Entry Time Analysis Ju-Hyeon Seo, Ryun-Seok Oh and Jun-Ho Choi, Pukyong National University, KOREA
11:10-11:30	Development of a Real-time Occupant Tenability Model with the Use of FDS Data Generator Hongqiang Fang, Qi Tong, Linhao Fan and Wai Cheong Tam, National Institute of Standards and Technology (NIST), USA	Contributions of Convection and Radiation at the Preheating Stage of Fine-sized Fuel Beds during Flame Spread Sergio Zarate Orrego, Jeronimo Carrascal, Juan Hidalgo, David Lange and Andres Osorio, The University of Queensland, AUSTRALIA	The Criterion of Non-combustibility Tests for Class 1 Building Materials in Taiwan Tzu-Yan Tseng, Ming-Yuan Lei, Chen-Ming Hsiao and Kuang-Chung Tsai, National Kaohsiung University of Science and Technology, TAIWAN	Advanced Early Smoldering Stage Fire Detection System for Large Warehouse Environments Wei-De Chen, Yen-Chiu Chen, Kun-Ming Yu, Ching-Lin Lee, Ming-Lun Wu, Min-Zhe Feng, Wen-Feng Chiu, Ming-Yuan Lei and Shun-Chih Wang, Chung Hua University, TAIWAN
11:30-11:50	Impact of Air and N2 Atmospheres on Thermal Runaway and Gas Emissions in 21700 Lithium-Ion Batteries Yeoseon Jeong, Hyukjoo Kwon and Geonhui Gwak, Korea Conformity Laboratories (KCL), KOREA	Simulations of Firebrand Ignition in Landscape-Scale Fire Spread Models Yiren Qin and Arnaud Trouvé, University of Maryland, USA		Study on the Possibility of False Alarms in Realistic Fire and Environmental Conditions Chia Lung Wu, Kang Chao, Chei-Fei Hung, Hsiao-Chun Huang, Tien-Fu Yu, Yu-Tang Wen and Ming-Mou Hung, Central Police University, TAIWAN
11:50-12:10	Experimental and Computational Analysis of Electric Vehicle Fire Behavior and Fire Spread Potential in Maritime Carriers Suhaeng Lee and Geonhui Gwak, Korea Conformity Laboratories (KCL), KOREA	Evaluating the Applicability of Swin Transformer for Enhancing Wildfire Detection Models Based on Faster R-CNN Sugi Choi, Sikuk Kim and Haiyoung Jung, Semyung University, KOREA		Quantitative Risk Assessment for Hydrogen Car Tank Explosions at Complex Hydrogen Refueling Stations Byoung-Jik Park, Unggi Yoon, Inju Hwang and Yangkyun Kim, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA
12:10-13:30	Lunch Break			
13:30-15:30	Session B-2: Structure in Fire	Session H-3: Fire Risk Analysis and Safety Design	Session D-3: Fire Spread	Session G-2: Enclosure Fire Dynamics
Chair	Min Jae Park (Pukyong National University, KOREA)	Kazunori Harada (Kyoto University, JAPAN)	Yingbin Xin (FM Global, USA)	Fei Tang (University of Science and Technology of China, CHINA)
13:30-13:50	Behavior and Performance Analysis of Fire Protection Materials Applied to Steel Structures According to Exposed Temperatures Hyun Kang, Yun Seong Kim and Oh Sang Kweon, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA	Comparison of Fire Safety Evaluation Results Based on Human Safety Assessment Criteria in Korea Young-Eun Yoon, Young-Hoon Bae and Seung-Chul Lee, Kangwon National University, KOREA	Characteristics of Ignition Energy and Pressure Rise of Ammonia/Oxygen/Inert-gas Mixtures by a Laser-Induced Breakdown Spark Ignition Tomohiko Imamura, Yuma Nakamura, Ko-Ichiro Hayashi and Daiki Hosaka, Suwa University of Science, JAPAN	Semi-empirical Model of Velocity Attenuation of Smoke Layer in Tranquil Flow Region in Arched Ceiling Tunnel Yasushi Oka, Aoi Tanno, Hideyuki Oka, Chiaki Iwamoto and Yoshiki Sakurai, Yokohama National University, JAPAN

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
13:50-14:10	**Characteristics of Water Film Flow on a Vertical Glass Surface and Its Control of Temperature Rise in the Glass** Zhang Shuo, Sonobe Shuhei, Wang Yu-Hsiang and Ohmiya Yoshifumi, Tokyo University of Science, JAPAN	**Preliminary study on the use of PPV during aircraft cabin interior firefighting** Mengling Li, Yudie Zhao, C.L. Chow, S.S. Han and W.K. Chow, The Hong Kong Polytechnic University, CHINA	**Numerical Model Investigating Heat and Mass Transfer of Wood During the Heating and Cooling Period of Fire** Anyang Sun, Kazunori Harada and Daisaku Nii, Kyoto University, JAPAN	**Examining Self-extinction of Propane Diffusion Flames in an Isolated Compartment** Ryan Falkenstein-Smith and Thomas Cleary, National Institute of Standards and Technology (NIST), USA
14:10-14:30	**Study on the Heat Transfer Laws of Small-Section Steel-Shell Concrete Immersed Tube Tunnel Structures Based on CFD-FEM Fires** Baochao Xie, Bei Zhao, Zhisheng Xu, Shanna Chen and Yifan Gao, Central South University, CHINA	**Development of a Robust Multiple Input and Multiple Output Detection Model for firefighter's thermal tenability** Qi Tong, Wai Cheong Tam and Hongqiang Fang, National Institute of Standards and Technology (NIST), USA	**Experimental Investigation of Ignition Conditions for PVC Sheaths with Varying Diameters under Internal Overheating** Chaoying Li, Zehua Yang, Wenbin Yao, Jin Lin and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA	**Experimental Study on the Ceiling Jet Flow Considering the Influence of Walls** Yunseong Kim, Hyewon Kim, Teahyeong Kim, Hyun Kang and Ohsang Kweon, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA
14:30-14:50	**Behavior of Steel Beam with End-plate Connection Base on Bolt Relaxation under High Temperature** Hee-Du Lee and Jun-Seop Lee, Pukyong National University, KOREA	**Risk Analysis of Parallel Fueling of LOX/Kerosene at Space Launch Site: Accident Scenario Construction and Lab-scale Experiments** Zehua Yang, Chaoying Li, Bing Bo, Haidong Liu, Kaiyu Zou, Wenbin Yao and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA	**Experimental Study on Fire Spread Risk in Roof-Type Photovoltaic Panel Systems** Yi-Chien Chen, Chia Lung Wu, Fan-Wei Liu and Wen-Yen Juan, National Taipei University of Technology (NTUT), TAIWAN	**A Methodology for Velocity Correction of a Bi-Directional Probe Considering Flow Angle** Sung Chan Kim and Jung Yong Kim, Kyungil University, KOREA
14:50-15:10	**Post-fire Residual Yield Strength and Ultimate Strength of Conventional Steel Depending on Load Ratios** Hyeong Jun Kim, Chang-Hwan Lee and Min Jae Park, Pukyong National University, KOREA		**A Simple Model for Predicting Fire Growth Behavior of Flexible Polyurethane Slab in a Compartment** Yimeng Cui, Kazunori Harada and Daisaku Nii, Kyoto University, JAPAN	**Characterising the Thermal Interface and Chemical Species Distributions in Compartment Fires for Wall-Bounded, Tilting and Free-Standing Fires Using Detailed Chemistry LES Model** Qian Chen, Timothy Bo Yuan Chen and Richard Kwok Kit Yuen, City University of Hong Kong, CHINA
15:10-15:30	**Fire-resistant Test and Simulation of Fire-resistant Steel H-section Columns** Yonghyun Cho, Eunmi Ryu, Donghin Shin, In-Hwan Yeo and Jaekwon Ahn, Korea Institute of Civil Engineering and Building Technology (KICT), KOREA			**Measurement of Smoke Entrainment Rate and Yield Ratio by a Downward Plume** Hiroyuki Tsuji, Kazunori Harada and Daisaku Nii, Kyoto University, JAPAN
15:30-15:50	Coffee Break			
15:50-17:10	Poster Session			

October 24th (Thursday)

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
08:30-09:10	Registration (Lobby, 3F)			
09:10-10:10	Session F-3: Wildland and Outdoor Fire	Session H-4: Fire Risk Analysis and Safety Design	Session B-4: Structure in Fire	Session E-4: Emerging Issues
Chair	Thomas G Cleary (National Institute of Standard and Techology, USA)	Yoshikazu Minegishi (Building Research Institute, JAPAN)	Chia Lung Wu (Central Police University, TAIWAN)	Minsuk Kong (Gachon University, KOREA)

Time	Column 1	Column 2	Column 3	Column 4
09:10-09:25	**Effects of Horizontal Wind and Terrain on the Behavior of Moving Fire Whirls** Mengyi Wang and Jiao Lei, University of Science and Technology of China (USTC), CHINA	**UBISdata: A Fire Monitoring and Object Detection Dataset** Mingyu Kim and Doochan Choi, KF UBIS Co. Ltd,, KOREA	**Finite Element Model for Full-scale Fire Test of Modular System in the Thermal Fields** Hyuk Kim, Chang-Hwan Lee and Min Jae Park, Pukyong National University, KOREA	**Performance Evaluation of YOLO-YCbCr Based Smoke Segmentation Method** Joohyung Roh, Sehong Min and Minsuk Kong, Gachon University, KOREA
09:25-09:40	**Experimental Study on Ignition of Dead Branches by Tree-Line Contact Fault** Hongmin Zhang, Chao Ma, Yiqian Qiao, Haixiang Chen, Naian Liu and Linhe Zhang, University of Science and Technology of China (USTC), CHINA	**Statistical Analysis on Fire Probability on Japanese Housing with Socio-Technical Observation** Atsuko Tani, Vienna University of Technology, AUSTRIA	**Evaluate Statistical Significance of Compressive Strength and Ultrasonic Pulse Velocity Degradation by Water/cement Ratio for Concrete Subjected to High Temperature** Wonchang Kim, Hajun Im and Taegyu Lee, Semyung University, KOREA	**Intelligent Fire Prevention Patrol System: A Survey** Min-Zhe Feng, Yen-Chiu Chen, Kun-Ming Yu, Wei-De Chen, Wen-Feng Chiu, Ming-Yuan Lei and Shun-Chih Wang, Chung Hua University, TAIWAN
09:40-09:55	**Global Sensitivity Analysis of the Rothermel Model Incorporating Parameter Variability** Yang Zhang, Naian Liu and Xiaodong Xie, University of Science and Technology of China (USTC), CHINA	**A Comprehensive Evaluation of Fire Incident Scenarios in Secondary Schools in England to Develop a Framework for the Environmental Analysis of Fire Safety Solutions in the Built Environment** Martina Manes, Andrea Lucherini and Ulises Rojas-Alva, Slovenian National Building and Civil Engineering Institute (ZAG), SLOVENIA	**Interaction between the Glass Cracks and the Interlayer Combustion of Laminated Glazing under Uniform Thermal Loading** Liaoying Zhou and Yu Wang, University of Science and Technology of China (USTC), CHINA	**Automatic Generation of Fire Alarm System Drawings using Generative AI** Junhee Choi and Hyun-Sug Cho, Daejeon University, KOREA
09:55-10:10			**Boosting-based Machine Learning and Numerical Soft Computing for Forecasting Steel Mechanical Properties at Elevated Temperatures** Irwan Afriadi, Chanachai Thongchom and Min Jae Park, Thammasat University, THAILAND	
10:10-10:30	Coffee Break			
10:30-12:10	Session J-2: Flame Dynamics	Session E-3: Emerging Issues	Session G-3: Enclosure Fire Dynamics	
Chair	**Kazurori Kuwana** **(Tokyo University of Science, JAPAN)**	**Tae Yoon Kim** **(Pukyong National University, KOREA)**	**Ritsu Dobashi** **(Tokyo University of Science, JAPAN)**	
10:30-10:50	**Comparative Study on Validation of Multi-step Chemical Reaction Model in Fire Simulation** Daehwan Yu and Joonho Jeon, Pukyong National University, KOREA	**Thermal Runaway Suppression of Lithium-ion Batteries by Injecting Water into the Battery Case - Firefighter's Perspective** Hie Chan Kang, Kunsan National University, KOREA	**An Experimental Study on the Fire Temperature Characteristic of Commuter Express Carriages with Multiple Side Doors in Tunnel of Urban Rail Transit** Chen Shiyi, Xu Zhisheng, Yin Yaolong, Yu Zihan, Ying Houlin, Wang Yuelin, Xu Ye and Zhao Jiaming, China Academy of Building Research Fire Institute, CHINA	AOAFST Board Meeting / Award Committee Meeting
10:50-11:10	**An Experimental Investigation of Flame Characteristics and Heat Transfer Mechanisms of Methanol and N-heptane Spill Fires on a Vertical Plate** Weixin Tong, Jingbo Xu, Chen Wang, Jie Ji and Jiping Zhu, University of Science and Technology of China (USTC), CHINA	**Characteristic of Lithium-ion Battery Thermal Runaway Jet Fire Venting against Baffles** Peng Gao, Junyuan Li, Zhixiang Cheng, Bang Tong, Mingwei Cao, Kaiqiang Jin, Jinhua Sun and Qingsong Wang, University of Science and Technology of China (USTC), CHINA	**A Study on Local Conditions Conducive to Deflagration in a Scaled Compartment** Marcos Vanella, Chandan Paul, Thomas Cleary and Ryan Ikenstein-Smith, National Institute of Standards and Technology (NIST), USA	
11:10-11:30	**Experimental Study on the Flame Spread Behavior over Flowing Diesel Fuel under Different Substrate Slopes** Sai Luo, Shuangpu Yu, Jie Ji, Chen Wang and Jingbo Xu, University of Science and Technology of China (USTC), CHINA	**A study on Quadruped Firefighting Robot Tactics and Design of TCMV (Tactical Command Moving Vehicle) for Support Life Search and Fire Suppression Activities at Firefighting Sites** Kyeong Min Kim and Eun Soo Son, KF UBIS Co. Ltd,, KOREA	**A Study on the Simple Prediction Equation for Ceiling Jet Flow Arrival Time in a Space Without a Vertical Wall Soffit** Kim Hyewon, Yamaguchi Jun-Ichi, Park Hyun-Woo and Ohmiya Yoshifumi, Tokyo University of Science, JAPAN	

Room	Convention Hall A	Convention Hall D (Café)	Peony Hall	Convention Hall C (HQ)
11:30-11:50	**Experimental Study of Flame Spread in all Directions around over Steady Flowing N-butanol Fuel** Jingbo Xu, Sai Luo, Chen Wang and Jie Ji, University of Science and Technology of China (USTC), CHINA	**Interpretable Machine Learning Scheme for Predicting Bridge Pier Scour Depth** Taeyoon Kim and Woo-dong Lee, Pukyong National University, KOREA	**Evaluation of Uncertainty in FDS Predictions of Smoke Concentration Under Various Fire Conditions** Hyo-Yeon Jang, Ho-Sik Han and Cheol-Hong Hwang, Daejeon University, KOREA	**AOAFST Board Meeting / Award Committee Meeting**
11:50-12:10			**A Closed-Form Solution of the Smoke Filling Time in Enclosure Growing Fires with Floor Leaks and Sloping Roofs** Yan Zhou, Michael Delichatsios and Rachel Tang, China University of Mining & Technology, CHINA	
12:10-13:30	Lunch Break			
13:30-15:10	**Session B-3: Structure in Fire**	**Session A-3: Material Flammability, Toxicity, and Related Testing Method**	**Session J-3: Flame Dynamics**	
Chair	**Heedu Lee** **(Pukyong National University, KOREA)**	**Joonho Jeon** **(Pukyong National University, KOREA)**	**Chuangang Fan** **(Central South University, CHINA)**	
13:30-13:50	**Ignition of Combustibles Adjacent to Honeycomb Sandwich Panels in Aircrafts** Sijie Ding, Xuhong Jia, Wei Tian and W.K. Chow, The Hong Kong Polytechnic University, CHINA	**Development of a Prediction Model for Heat Release Rate of a Train Seat based on Properties obtained from Small-Scale Material Burning Test - Lateral Flame Spread Behavior on Seat Surface and Its Effect on Burning Behavior** Junichi Takano and Ken Matsuyama, Railway Technical Research Institute, JAPAN	**Investigation of Impact of Initial Fuel Depth on the Burning Rate of Pool Fires for the Different Extinction Modes in an Enclosed Compartment** Jinbo Wang, Xiao Chen, Jia Jia and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA	**Void**
13:50-14:10	**Fire Resistance of High Altitude Hermetic Pressurization Building: A Case Study** Shijie Li and Chao Zhang, Wuhan University, CHINA	**Inhibition of Fire Suppressants on the CO Removal over Ceria-supported Transition Metal Catalysts in Simulated Fire Smoke** Ning Kang, Zhiqiang Zhao, Xiaoyang Yu, Qian Li, Jin Lin and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA	**Importance of Detailed Fire Chemistry Combustion Modelling of Hybrid Fuels Towards Enhancement in Temperature And Gaseous Products Predictions** Anthony Chun Yin Yuen, Timothy Bo Yuan Chen and Qian Chen, Hong Kong Polytechnic University, CHINA	
14:10-14:30		**Lightweight Aerogel Sheet Ecuipped with Fire-Extinguishing and Fire Protection Functions for Safety Enhancement of Lithium-ion Battery** Yueyue Xiao, Heping Zhang, Long Shi, Yuelei Pan and Xudong Cheng, University of Science and Technology of China (USTC), CHINA	**Analysis of Air Leakage by the Opening Angle of the Door** Chae-Young Hwang, Ji-Hun Kim, Ryun-Seok Oh and Jun-Ho Choi, Pukyong National University, KOREA	
14:30-14:50		**Analysis of the Light Extinction Effects by Smoke Particle Size and Composition from Polymethyl Methacrylate Combustion** Seonhyo Lee and Joonho Jeon, Pukyong National University, KOREA	**Study on Behaviors and Mechanism of Flame Spread over RP-3 under Lateral Flow** Xuanren Wang, Yuhang Chen, Keke Wang and Longhua Hu, University of Science and Technology of China (USTC), CHINA	
14:50-15:10		**Predicting the Fire Performance of Intumescent Fire-Retardant Coating with Inert and Oxidative Reaction Schemes** Liang Yi, Saiya Feng, Zhengyang Wang, Yan Ding and Yuhao Li, Central South University, CHINA	**Flame Spread of Rocket Kerosene in Oxygen-enriched Environment: Experimental Study and Theoretical Analysis** Wenbin Yao, Yuting Luo, Zehua Yang, Bing Bo and Shouxiang Lu, University of Science and Technology of China (USTC), CHINA	

Time		Session C-3: Evacuation and Human Behaviour	Session I-2: Fire Suppression	Session J-4: Flame Dynamics
15:10-15:30		Coffee Break		
15:30-17:10		Session C-3: Evacuation and Human Behaviour	Session I-2: Fire Suppression	Session J-4: Flame Dynamics
Chair		Leong Poon (Leong Poon & Associates, MALAYSIA)	Taehoon Kim (Seoul National University of Technology, KOREA)	Kazurori Kuwana (Tokyo University of Science, JAPAN)
15:30-15:50	Void	**Fast Trajectory Extraction Using Purely Point Based Neural Network** Ruolong Yi, Mingyu Du, Weiguo Song and Jun Zhang, University of Science and Technology of China (USTC), CHINA	**Experimental and Numerical Study on Water Mist Extinguishing for Wood Smoldering: The Impact of Spray time and Smoldering Temperature** Pengfei Ding, Qize He, Lijing Wang and Yun Yang, Shanghai Fire Research Institute of MEM, CHINA	**Experimental Study of the Obstacle Wall Restriction Effect on Burning Characteristics of Pool Fire in the Enclosed Cabin** Yi Zhang, Xiao Chen, Shouxiang Lu and Man Yuan, University of Science and Technology of China (USTC), CHINA
15:50-16:10		**Optimal Evacuation Route Determination for Occupant Safety in Building Fires: Application of Dijkstra's Algorithm Considering Evacuation Influencing Factors** Gahyeon Choi, Yuanlong Zhang and Youngchan Kim, Dongguk University-WISE, KOREA	**Tuning Stability and Fire-extinguishing Performance of Aqueous Film-forming Foam by Aluminium Hydroxide Nanoparticle Flame Retardants** Youjie Sheng and Shanwen Zhang, Xi'an university of science and technology, CHINA	**Experimental Investigation on Flame Geometry and Downstream Heat Flux from Diffusion Flames on Inclined Fuel Surface under Sub-atmospheric Pressures** Yuhang Chen, Shangqing Tao, Lingyi Di, Xucheng Shi, Wenqi Ye, Fei Tang and Longhua Hu, University of Science and Technology of China (USTC), CHINA
16:10-16:30		**Assessment of Stairwell Pressurization Effects on Door Opening Forces During Building Evacuations** Ji-Hun Kim, Ryun-Seok Oh, Chae-Young Hwang and Jun-Ho Choi, Pukyong National University, KOREA	**Analysis of Droplet Collision Effects in Sprays from Two Adjacent Sprinklers** Hun Heo and Taehoon Kim, Seoul National University of Science and Technology, KOREA	
16:30-16:50		**Evaluation of Recognition Based on Voice Alarm System Sound Pressure Levels Using EEG Measurements** Ji-Won Gu, Ryun-Seok Oh and Jun-Ho Choi, Pukyong National University, KOREA	**Experimental Study on Tunnel Fire Dynamics under the Combined Action of a Water Spray System and a Branch Pipe Exhaust System** Zhan Wang, Jiahao Hu, Zhi Tang, Zheng Fang, Tarek Beji and Bart Merci, Wuhan University, CHINA	
16:50-17:10		**Suggestion of Optimal Phased Evacuation Scenario Developing and Evaluating Methods for High-rise Buildings** Seongkyung Park and Masayuki Mizuno, Tokyo University of Science, JAPAN	**Temperature Reduction Effect in a Fully Developed Compartment Fire by Water Application** Chia-Hsin Chen, Masaki Noaki, Yoshifumi Ohmiya and Jun-Ichi Yamaguchi, Tokyo University of Science, JAPAN	
18:00-20:00		Banquet (Convention Hall A)		

October 25th (Friday)

09:00-18:00	Technical Tour

AOSFST 2024　List of Posters

[A] Material Flammability, Toxicity, and Related Testing Method

PA-1	A Novel Method to Gauge the Timber Surface Crack under Fire Radiation using Narrow-spectrum Illumination and Image Processing, Wei Chu, Jun Fanb, Yu Wang
PA-2	Behavior of the Flamethrowing from the Fuel Tank during a Motorcycle Fire, Hiroki Yamasaki, Katsuhiro Okamoto, Mitsuru Watanabe, Keisuke Ito, Akihiro Kawaguchi, Toshikazu Ichikawa, Masakatsu Honma
PA-3	Combustion Kinetics of Cellulose Modelled by ReaxFF MD, Shuaihong Liu, Hanfeng Jin
PA-4	Experimental and Numerical Investigation on the Combustion Behavior of Densified Wood, Saiya Feng, Liang Yi, Yanzhen Zhuang, Zhengyang Wang
PA-5	Experimental and Theoretical Investigations on the Crack Pattern and Crack Width of Densified Wood under Radiative Heating, Tianyang Chua, Zhengyang Wang, Shaorun Lin, Chuangang Fan, Saiya Feng
PA-6	Fire Risk Rating and Fire Safety Assessment of Wood Specimens Treated with TiO2 Mixtures using Chung's Equation-IX, Eui Jin, Yeong-Jin Chung
PA-7	Ignition Characteristics of Pine Wood Building Material under the Coupling Effect of Time-dependent Radiation Heat Flux and Cross Wind, Li Yan, Xiaoyu Ju, Kim Meow Liew, Lizhong Yang
PA-8	Risk Evaluation of Smoke and Carbon Monoxide Produced for Hard Wood Specimens in Fire, Eui Jin, Yeong-Jin Chung
PA-9	Smoke Risk Assessment of Wood Specimens Treated with Metal Oxide using Chung's Equation-VI, Eui Jin, Yeong-Jin Chung
PA-10	Study on the Damage of Cable and Cabinet by Motor Control Cabinet Fire in a Switchgear Room, Yu Zhang, Weon Gyu Shin
PA-11	The Effect of Various Incident Heat Fluxes on the Yields of Polymers using a Cone Calorimeter, Ju-Yeol Park, Sun-Yeo Mun, Cheol-Hong Hwang
PA-12	The Effects of Surface Area Exposed to Heat Flux on Combustion Characteristics of Activated Carbon, Yejin Ha, Jihoon Park, Joonho Jeon

[B] Structure in Fire

PB-1	Applicability of Equivalent Fire Duration Formula to Glue Laminated Larch Wood Wall, Kazunori Harada, Shoma Makino, Anyang Sun, Daisaku Nii
PB-2	Comparative Analysis of Fire Resistance in Reinforced CFT Columns for High-tech Industrial Facilities, Arum Jang, Soo Min Baik, Young K. Ju, Min Jae Park
PB-3	Comparison of fire Resistance Performance of Composite Columns in High-tech Industrial Facilities Based on Steel Tube Thickness, Seok Woo Kim, Arum Jang, Soo Min Baik, Young K. Ju, Min Jae Park
PB-4	Finite Element Analysis of Fire Resistance Performance of CFT Column and Built-up CFT Column under Axial Compression in Standard Fire Conditions, Do jin Jung, Chang-Hwan Lee, Min Jae Park

[C] Evacuation and Human Behaviour

PC-1	A Survey and Evaluation Method for Speech Intelligibility of Firefighting Radios Considering the Environment of the Fire Site, Insu Yeom, Jeongho Jeong, Jihyun Kwark
PC-2	Development of ALIO System for Forwarding Information of Evacuees in Rescue Area, Minji Ha, Taeyeon Lee, Jaeyeong Park, Seoyoung Jang, Sangyong Park
PC-4	EvacUnet: A deep Learning-based Evacuation Analysis Method for Assisting Fire Safety, Mingyu Du, Ruolong Yi, Jun Zhang, Weiguo Song
PC-5	Numerical Simulations for Designing Experimental Equipment to Analysis Psychological and Behavioral Characteristics in Fire, Soyoung Jeong, Sungryong Bae
PC-6	Study on Comparison between Real and VR Environments in one-on-one Passing and Overtaking Scenarios: Analysis of Movement Experiments in VR and Real Spaces, Masayuki Mizuno, Shiro Ichimura, SeongKyung Park, Toshinari Tanaka, Kosuke Fujii
PC-7	Numerical Case Study of Evacuation Strategies in Early Childhood Centers, Hong Sheng Huang, Ching Yuan Lin

[D] Fire Spread

PD-1	Flame Spread Characteristics of Densified Wood with Various Sample Widths and Densities, Yang Zhou, Chunli Liu, Penghui Zhou, Zhengyang Wang, Yuhao Li, Saiya Feng

[E] Emerging Issues

PE-1	Study on Establishing Performance Testing Methods for Fire Monitors Mounted on Firefighting Robots, Dong-Ha Jang, Euy-Hong Hwang, Seung-Geun Park, Dong-Gun Nam, Woo-Sub Lim, Hye-Yeon Ji
PE-2	Analysis of Fire Risks due to Technological Trends in lithium-ion Battery and Fire Prevention Measures for Energy Storage Systems, Suhaenge Lee, Youngseob Park, Geonhui Gwak, Hyukjoo Kwon, Hyungjun Kim
PE-3	Fast Trajectory Extraction using Purely Point Based Neural Network, Ruolong Yi, Mingyu Du, Weiguo Song, Jun Zhang

PE-4	**Study on Fire Safety Measures and Improvement Plans for BEV(Battery Electric Vehicle) in Domestic Mechanical Parking Station,** Yoolim Lee, Taehyeong Kim, Yerin Lee, Sungeun Lee, Youngjin Kwon
PE-5	**Investigating Thermal Runaway Characteristics and Fire Hazards of Large Format Lithium Iron Phosphate Battery under Various Triggering Methods,** Pengjie Liu, Chengdong Wang, Qingsong Wang

[F] Wildland and Outdoor Fires

PF-1	**An intercomparison of Wildfire Behavior Models in Fire Dynamics Simulator (FDS) with FireFlux II Experiment,** Yu Jeong Kim, Ali Tohidia, Craig B. Clements
PF-2	**Estimation of Wildfire Response Process using Mobile phone-based Floating Population Data,** Yoon-Ha Lee, Min-Seok Kim
PF-3	**Fire Safe African Homes on the Wildland Urban Interface (AfriWUIFire),** Natalia Flores Quiroz, Richard Walls, Miss Hasimawaty Binti Mat Kiah, Emile van Zyla, Sayaka Suzuki, Samuel Manzello, Doug Harebottle, Phetole Ramatsoma, Ednah Kgosiesele, Guy Godiraone Yuyi, Patricia Maswibilili, Rejoice Tsheko

[G] Enclosure Fire Dynamics

PG-1	**Effect of Fire Growth Curve for Combustibles Arrangement Changes in Reduced-scale Warehouse Rack,** Ho-Sik Han, Cheol-Hong Hwang
PG-2	**Gas Explosion Analysis of a Hydrogen Fuel Cell Ship using XiFoam,** Donggeun Heo, Byung Chul Choi
PG-3	**Impact of Railway Vehicle Presence on Hot Gas Flow during Tunnel Fires,** Yuki Yamauchi, Sanetoshi Saito
PG-4	**Predicting the Flashover Occurrence and Energy Distribution in Compartment Fires with Different Boundary Materials,** Ting Xia, Hongli Ruan, Yu Wang
PG-5	**Risk Analysis of the Dust Explosion during Usage of Biomass Fuels,** Nham Sy Trung Kien, Ritsu Dobashi
PG-6	**Tunnel Fire Heat Release Rate and Longitudinal Wind Speed Prediction Method Based on YOLO-ResNet,** Jiahao Hu, Zhan Wang, Zhi Tang

[H] Fire Risk Analysis and Safety Design

PH-1	**Air Breakdown Characteristics in Electrode Structure with Conductive Particle Defects to Prevent Electric Fires in Power Facilities,** Dong-Young Lim, Herie Park, Bong Gon Chung, Seung Wook Jee
PH-2	**Comprehensive Fire Risk Evaluation in Functional Vegetated Green Building Systems,** Zhen Ni, Danyang Zhao, Denvid Lau, Cheuk Lun Chow
PH-3	**Deciphering Fire's First Fingerprints: A Convolutional Neural Network Approach to Soot Particle Analysis,** Yuchuan Li, M. Hamed Mozaffari, and Yoon Ko
PH-4	**Experimental Study on the Evolution Characteristics of Fire at the Bottom of a Moving Train,** Xinyang Fan, Fei Tang, Nannan Zhu, Yajun Huang, Longhua Hu
PH-5	**Study on Fire Safety Enhancement of Naturally Ventilated Sustainable Buildings using Numerical Analysis,** ShiuanCheng Wang, ChungHwei Su, YueLin Chiang
PH-6	**Study on the Remote Fire Risk Assessment Model of Industrial Buildings Based on Image Recognition Method,** Saiya Feng, Zhengyang Wang, Chuangang Fan, Yuhao Li, Jian Shen, Jun Li, Yanzhen Zhuang
PH-7	**Suggestion of a Simple Education Course for Improving Response Ability on Fire,** Byoungwoo So, Sungryong Bae

[I] Fire Suppression

PI-1	**A Study on the Fire Extinguishing Effect of Gas Hydrate Fire Extinguishing Agents for Fire Grenade,** Dong-Gun Nam, Dong-Ha Jang, Euy-Hong Hwang, Seung-Geun Park, Jae-bum Yu
PI-2	**Analysis of Heat Acclimatization Response of Firefighters at Activity Sites,** Shinya Yanagita, Kensuke Matsuo, Yudai Tanaka, Yamato Sugita
PI-3	**Simulation and Analysis of Safe Firefighting Distances in Oil Tank Fires using FDS and ALOHA,** Ming-Chuan Hung, Ching-Yuan Lin, Gary Li-Kai Hsiao

[J] Flame Dynamics

PJ-2	**Experiments of Temperature and Buoyant Plume Rise Time in Stairwell during Fire in Atria,** Yun Young Kim, Chi Young Lee
PJ-4	**Investigation of the Critical Temperature using a Combination of Solid Fuels on Backdraft Occurrence,** Chia-Lung Wu, Wen-Yen Juan, Chung-Yu Hung
PJ-5	**Numerical Simulation Study on the Spray Jet Structure of Axial Flow Induced Water Mist,** Huazhong Sun, Xiaolong Zhu, Jiangyue Zhao, Shi Hu, Jialing Yu, Xishi Wang
PJ-6	**Proposal of Vertical Distribution Functions for Temperature and Velocity of Flow Field Induced by a Fire in an Arched Ceiling Tunnel,** Yoshiki Sakurai, Yuji Saito, Yasushi Oka

Keynote Speech I

Prof. Yasushi Oka • Yokohama National University, JAPAN

Flow properties of fire-induced thermal currents

October 22(Tue), 09:30-10:00 Convention Hall A

◯ Biography

He graduated from the Department of Applied Chemistry, Faculty of Science, Tokyo University of Science in 1985. He completed a master's degree in applied chemistry at the Graduate School of Science, Tokyo University of Science in 1987. He left the doctoral course with credit completion in architecture at the Graduate School of Science and Technology, Tokyo University of Science in September 1991.

Since joining Yokohama National University in October 1991, he has been involved in teaching and research related to fire safety engineering for over 30 years. He received his doctorate in engineering in 1994.

His research area covers a wide range of topics such as
• Ceiling-jet characteristics under flat and/or inclined ceilings
• Smoke layer characteristics in tunnel fires
• Plume characteristics over a horizontally oscillating fire source
• Firefighter fatigue during firefighting operations
• Combustion behaviour in poorly ventilated compartment fires
• Response of multi-spectrum infrared flame detectors to diffusion flames partially hidden by obstructions

He received the best paper award at the 8th Asia-Oceania Symposium on Fire Science and Technology in 2010, the Japan Association for Fire Science and Engineering Award in 2015, and the best paper award at the Japan Society for Safety Engineering in 2019.

◯ Abstract

As is well known, the fire phenomenon itself is a complex of combustion, gas flow, heat transfer and other phenomena, and the variety of fire sources and fire growth spaces means that each has its own specific problems to solve. Therefore, the field of fire safety engineering requires not only the accumulation of scientific knowledge about fire properties, which vary according to the conditions of fire occurrence, but also the technological evolution to practically handle fire safety issues based on this knowledge.

We accumulate scientific knowledge by conducting experiments focused on the target fire phenomenon and deriving empirical formulae based on the obtained measurement results, by deriving semi-empirical models based on theoretical considerations and experimental results, and by interpolating measured data through numerical experiments for phenomena that cannot be covered by experiments alone, or by applying numerical simulations for phenomena that cannot be covered by experiments alone. To achieve this, we aim to understand complex fire phenomena by using three approaches: experiments, theory, and numerical calculations.

This presentation will cover three topics related to the presenter's work on predictive calculation methods for fire-induced hot air flow phenomena, which are essential for the smooth operation of performance-based fire safety design methods.

It is hoped that the application of these research approaches will contribute in some way to the future development of fire safety engineering.

Keynote Speech II

Prof. Weiguo Song • University of Science and Technology of China, CHINA

Pedestrian and evacuation dynamics

October 22(Tue), 10:00-10:30 Convention Hall A

Biography

Prof. Weiguo Song, full professor of the State Key Laboratory of Fire Science, University of Science and Technology of China. He got Bachelor's and Ph.D degree in the University of Science and Technology of China, and has served as a guest researcher at NIST. He is engaged in fundamental research on fire dynamics and evacuation dynamics, and is leading multiple national scientific research projects such as the National Key Research and Development Program and the National Natural Science Foundation of China. He has published over 100 SCI-cited papers, obtained 11 invention patents and 8 software copyrights, and has been continuously selected for the Elsevier China Highly-cited Scholars for the past 10 years. His research results have provided reference for the International Building Code (IBC) and Chinese national standards, and have been applied to nearly 100 important buildings and places. He won the second prize of National Science and Technology Progress Award of China, China Youth Science and Technology Award etc. He has served as a member of PED and TGF Steering Committee, chairman of the organizing committee of PED conference, topic leader of IAFSS symposium, organizer and co-chair of IAFSS evacuation workshop.

Abstract

In many countries, there are large scale of crowd gatherings during festivals, religious activities, sport games and so on. Sometimes disaster may occur and causes massive loss of human lives. In recently years these kind of disasters occurred in India, Korea, Indonesia, Israel, Cambodia, China, Arabian countries and many other countries. The scientific problems behind these activities is pedestrian and evacuation dynamics (PED), that is very important to understand crowd motion. The aims of PED is to increase the safety and comfort of pedestrians. The tools and methods used in PED study and design include legal regulations, guidelines and handbooks and computer simulations. Usually prescriptive methods, macroscopic models and microscopic models are used. To develop such methods and models, the theory, data and model of PED is in great need. However pedestrian and evacuation dynamics is very complicated. There are limited basic data, but big differences between data. There are over 100 models, but the reliability and applicability of models is still limited. The contradictions of data and models may be due to many reasons, including measurement methods, flow direction, psychological factors, environments, composition of crowds, education and many other factors. In this presentation, progress in PED experiments and data processing method is introduced. The PED experimnts include multiple scenarios, e.g. single file, straight channel, bottleneck, turning channel, crossroads, crawling, animal motion, stairwell, obstacles experiment etc. The high-density crowd experiment and heterogenous experiment is introduced in detail. The pedestrian behaviors, interaction between pedestrians, velocity characteristics and fundamntal diagrams are analyzed. The heterogeneous characteristics leading from old people, children or the disables are discussed. Then the data processing method, especially pedetrian detection method based on deep learning, together with relative dataset is introduced. A velocity and density extraction mothod based on multi-level dilated CNN and optical flow is built. It is indicated that the method is good at velocity and density analysis based on input pedestrians pictures, and the calculation results are consistent well with true values eithre in experiment scenario or real scenario. The calculation efficiency of the method is much higher than traditional method. Based on the pedestrian detection module and location prediction module, a trajactory extract method is built. After input consecutive frames of pedestrian video, the method can give pedestrian trajactories in a high efficiency. The results are consistent with true value, and the precision and recall value is fairly good. The progress in pedestrian and evacuation dynamics is very fast in recently years, the discusstion and collaboration is very important for the PED study community.

Keynote Speech Ⅲ

Dr. Hyung-Jun Kim   • Korea Conformity Laboratories(KCL), KOREA

Lithum-ion Battery Fire Safety

October 23(Wed), 09:30-10:00 Convention Hall A

○ Biography

Dr. Hyungjun Kim received his Ph.D. in 2012 from the University of Tokyo, Japan for his research on the spalling mechanism due to deformation of polymer cement mortar in high-temperature environments. He joined the Korea Conformity Laboratories (KCL) in 2013 and is currently a principal research engineer of Advanced Fire & Disaster Management Center. He is actively conducting research in the fields of special fires and firefighting, including research and development of fire impacts and extinguishing methods in buildings for special fires such as fire-resistant material structures for buildings, electric vehicle fires, ESS fires, and hydrogen fires, and standardization.

✉ arc7707@kcl.re.kr

○ Abstract

Fire Characteristics and Suppression Tests of Electric Vehicles (Lithium-ion Batteries)

Recently, there has been heightened phobia regarding electric vehicles in Korea, especially following a fire accident involving an electric vehicle in the underground parking lot of an apartment complex in Cheongna, Incheon. In Korea, outstanding researchers have been actively studying the electrical safety and fire safety of large secondary batteries, particularly lithium-ion batteries, used in electric vehicles. Our research team has been conducting extensive studies on the fire characteristics of lithium-ion batteries and the fire behavior of electric vehicles equipped with these batteries, as well as their suppression properties.

In the industrial sector, ensuring fire safety is becoming a critical issue, especially as electric vehicles and energy storage systems (ESS) used in power grids, along with other renewable and new energy sources, are being promoted as future national strategic industries. In this keynote presentation, we aim to introduce the research conducted by KCL to date. We hope this will provide useful information for researchers in the field of lithium-ion battery fires and serve as a platform for research collaboration, bringing us closer to resolving fire safety issues

In this presentation, I will cover the following topics:
1. Fire characteristics of lithium-ion battery systems for electric vehicles
2. Suppression characteristics of lithium-ion battery systems for electric vehicles
3. Fire characteristics of electric vehicles based on battery cell types
4. Fire safety facilities in electric vehicle charging zones within underground parking lots

Given the high level of interest in these matters, we plan to continue discussing opinions and perspectives through ongoing collaboration to enhance the quality and advancement of the research.

Keynote Speech Ⅳ

Prof. CL Chow • City University of Hong Kong, Hong Kong, CHINA

Fire Safe Green Facades: Development and Prospect

October 23(Wed), 10:00-10:30 Convention Hall A

Biography

PhD degree from the Department of Architecture, University of Cambridge, UK in 2009 under the supervision of Professor Koen Steemers.

Now an Associate Professor in the Department of Architecture and Civil Engineering, City University of Hong Kong. She is currently the Program Leader of Architectural Engineering.

Nadia published more than 100 SCI journal articles. She has attracted over US$2.5 million research and development funds from government funding agencies. Her research interests including:

The application of Computational Fluid Dynamics in simulating fires, natural ventilation, facade fires, smoke toxicity and fire safety in green and sustainable buildings.

AOSFST 2024

Abstract

Double-skin facades (DSFs) can provide passive building solar control. Putting in plants to create double-skin green façades (DSGFs) can reduce solar heat gain. A new energy harvesting system using appropriate plants can convert solar energy to chemical and electrical energy. This gives a new and clean energy source in second-generation green buildings. However, the fire hazard of DSGFs is a key concern in its wide application.

Fire-safe DSGFs with energy-harvesting design in tall green buildings will be investigated and developed in this project. Energy harvesting system will be studied on fundamentals of photosynthetic microbial fuel cells (MFCs); improvement of the MFCs energy harvesting efficiency; and optimization of DSGFs. Fundamentals on extracting photosynthetic energy in MFCs will be simulated by First-Principles Molecular Dynamics. Energy harvesting efficiency will be explored in DSGFs. It is envisioned that the photosynthetic MFCs with a maximum utilization of building envelop can provide a maximum power output of 65 mW/m2.

DSGFs will have combustibles on green plants for passive solar control; and energy harvesting system with MFC. Fire research is needed on examination of the hazardous scenario created in the façade cavity by a window plume from a flashover fire in an adjacent room. Dry plants and other combustible components can be ignited easily. The subsequent conflagration would emit vast quantities of hot toxic gases and particulate matter that would be trapped in the façade cavity. Breaking the interior glass skin would spread smoke to upper rooms. Moreover, the stack effect of tall buildings would drive the movement of smoke and flames within the façade cavity, particularly in places with very low outdoor winter temperatures. Integrated understanding for the provision of fire-safe DSGFs with energy harvesting systems is necessary.

+ MEMO +

THE FIRST STEP TOWARD PUBLIC SAFETY STARTS WITH FIRE FACILITY

The Korea Fire Facility Association is committed to ensuring public safety and high-quality fire facility construction. We explore and propose development directions in various fields, including fire protection design, construction, supervision, and flame retardant technology, to build a safer society.

Korea Fire Facility Association

Multidisciplinary Engineering Solution Provider

HIMEC

Founded in 1966, HIMEC,
a specialized architectural engineering company,
is striving to become a century-old business.

We are committed to providing the highest quality,
customized engineering solutions tailored to
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fire protection and life safety systems,
eco-friendly consulting, building operations consulting,
commissioning, and project management &
construction management(PM&CM).

Multidisciplinary Engineering Company **HIMEC**

INTEGRATED SYSTEM DESIGN	MECHANICAL SYSTEM ENGINEERING	ELECTRICAL & ICT SYSTEM ENGINEERING
FIRE & LIFE SAFETY	OVERSEAS PROJECT	AIRPORT, RAILWAY, TUNNEL ENGINEERING
DATA CENTER ENGINEERING	BIM & DIGITAL TRANSFORMATION	TEST & COMMISSIONING
RELIABILITY TEST	SUSTAINABLE CONSULTING	REMODELING & RETROFIT
PROJECT MANAGEMENT & CONSTRUCTION MANAGEMENT	HI-BEMS & OPERATION MANAGEMENT CONSULTING	RESEARCH & DEVELOPMENT

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7&8F, World Meridian Biz Center, 53, Yangsan-ro, Yeongdeungpo-gu, Seoul, 07271, Korea
+82-2-6340-3000

EV-Drill Lance

▶ EV-Drill Lance Fire Fighting Process

※OPERATING POWER: WATER PRESSURE

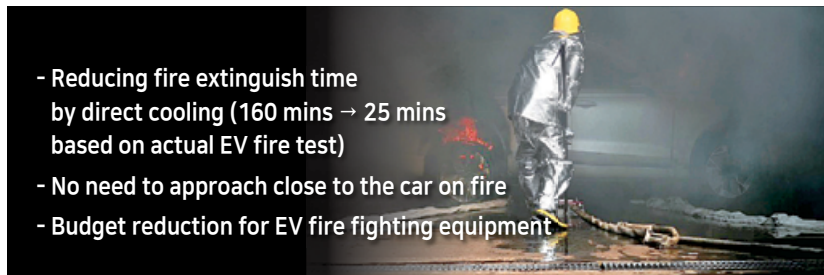| 01. Fire Break out	02. Applying EV-Drill Lance	03. Fire suppression
Thermal runaway of battery(800℃)	Penetrating Battery Case & Supplying Fire Water	Direct Cooling-down of Battery Cells & Preventing Reignition

▶ Effects after using EV-Drill Lance
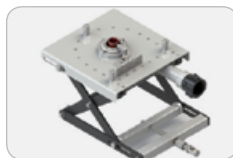
FILK Test Certificate

- Reducing fire extinguish time by direct cooling (160 mins → 25 mins based on actual EV fire test)
- No need to approach close to the car on fire
- Budget reduction for EV fire fighting equipment

▶ Type of EV-Drill Lance

Handle(EVDL-H)	Fixed(EVDL-F)	Moving(EVDL-M)
Manually operated device	Installed under the floor of parking area and automatically start to suppress fire	Device moves to the vehicle on fire via railway and automatically suppress fire

▶ Specification

Type	Handle(EVDL−H)	Fixed(EVDL−F)	Moving(EVDL−M)
Material	Aluminium + Stainless Steel	Aluminium + Stainless Steel	Aluminium + Stainless Steel
Pressure	4 ~ 10 Bar	4 ~ 10 Bar	4 ~ 10 Bar
Flow Rate	20 ~ 30m³/hr	20 ~ 30m³/hr	20 ~ 30m³/hr

▶ Awards

Silver prize at 49th International Exhibition of Inventions Geneva

Special prize at 49th International Exhibition of Inventions Geneva

Minister prize at KFI

▶ Patent

Mission

Securing national safety through the promotion of the fire industry and quality improvement of firefighting facilities

Vision

World-class firefighting institute for the people

Title Korea Fire Institute

Location

(Headquarters) 331, jisam-ro, Giheung County, Yongin City, Gyeonggi Province, Korea

(Firefighting Apparatus Center) 426, Yeonmi-ro, Maengdong-myeon, Eumseong County, Chungcheongbuk Province, Korea

(Nambu office) 1545, Dalgubeoldae-ro, Dalseo-gu, Daegu Metropolitan City

(Ulsan office) 25, Jeongdong-ro 42 gil, Nam County, Ulsan, Korea

(Yeosu office) 78, Hwasan-ro, Yeosu City, Jeollanam Province, Korea

(Suwon office) 107, Gwanggyo-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea

> Since its establishment in 1977,
> Korea Fire Institute has spared no effort to
> keep all people safe from fire accidents.

History

June 1977	Foundation of the Korea Fire Equipment Inspection Association
July 1979	Foundation name changed to Korea Fire Equipment Inspection Corporation(KFI)
July 1992	Organization relaunched as a special corporation
Dec. 1993	Organization designated a regional body for ISO/TC21 for firefighting devices
Feb. 1996	KOLAS accreditation acquired
July 1996	Inspections and maintenance of hazardous material tanks bein
July 2002	Korea's largest firefighting test facility constructed (office relocated to Yongin City)
Jan. 2003	Firefighting Technology Research Center launched
May 2005	Asia Fire-protection Inspection Council (AFIC) launched
Dec. 2008	Korea Fire Institute (KFI) launched as a special corporation
July 2011	Tests and inspections of firefighting apparatus begin
March 2014	The Firefighting Apparatus Center in Eumeseong County, Chungcheongbuk Province, constructed

Global Recognition

KFI is accredited as an inspection body in accordance with the recognized International Standard ISO/IEC 17020:2012(en)(Conformity assessment — Requirements for the operation of various types of bodies performing inspection)

ISO 17020	Scope of Accreditation
	Fire Control Panel(Receiver), Transmitter, Fire Detector, Fire Bell, Manual Fire Alarm Box, Gas Leakage Detector, Exit Light, Emergency Light, Current Leakage Alarm Units, Fire Extinguisher, Automatic Type Fire Extinguishing Unit for cooking Equipments, Cabinet Type Automatic Fire Extinguishing System, Automatic Deffusion Extinguishing Tools, Aerosol Type Simple Extinguishing Tools, Fire Extinguishing Tools For Throwing, Fire Extinguishing Agents, Sprinkler Head, Water Flow Control Valve, Controller of Fire Pump, Gas-pipe Selection Valve, Fire-hose, Fire Department Connector, Nozzle, Angle-valve and Hydrant, Air Respirator, Life Sack, Escape Ladder, Automatic Descending Life Line, Automatic Extinguishing System, Flame Retardant Agents

KFI is accredited as a testing body in accordance with the recognized International Standard ISO/IEC 17025 : 2005(General requirements for the competence of testing and calibration laboratories).

ISO 17025	Scope of Accreditation
	01. Mechanical Test 01.013 Physical Test 02. Chemical Test 02.012 Gases 02.013 Petroleum Products 04. Heat and Temperature Measurement 04.002 Fire

Global Relationship

Agreement

No.	Organization	Nation	Date
1	SHFRI(Shanghai Fire Research Institute)	China	04. 06. 30.
2	BRE	UK	04. 10. 26.
3	TÜV SÜD PSB(Productivity and Standards Board)	Singapore	05. 08. 08.
4	UL(Underwriter Laboratories)	USA	06. 03. 16.
5	SCFRI(Sichuan Fire Research Institute)	China	06. 05. 18.
6	TFRI(Tianjin Fire Research Institute)	China	06. 10. 30.
7	CSIRO(Commonwealth Scientific and Industrial Organization)	Australia	06. 12. 20.
8	SP Technical Research Institute	Sweden	07. 08. 30.
9	NRIFD(National Research Institute of Fire and Disaster)	Japan	07. 12. 06
10	Sucofindo	Indonesia	09. 12. 02
11	CFS(China Fire-protection Safety)	Taiwan	10. 04. 26.
12	SIRIM QAS(Standards and Industrial Research Institute of Malaysia)	Malaysia	10. 09. 30.
13	JFEII(Japan Fire Equipment Inspection Center)	Japan	13. 03. 07.
14	BFRD(Bangkok Fire Rescue Department)	Thailand	14. 04. 10.
15	VFRPD(Vietnam Fire & Rescue Police Department)	Vietnam	15. 12. 31.
16	FM Approvals	USA	16. 06. 17.
17	GCNP(General Commissariat of National Police)	Cambodia	16. 12. 06.
18	DRI(Disaster Research Institute)	Mongolia	17. 04. 26
19	NFPA(National Fire Protection Association)	USA	17. 06. 05.
20	NEMA(National Emergency Management Agency)	Mongolia	19. 12. 20
21	RIFSES(Research Institute of Fire Safety and problems of Emergency Situations)	Uzbekistan	20. 06. 17.
22	MES(Ministry of Emergency Situations)	Kyrgyzstan	20. 10. 08.
23	BMA(Fire and Rescue Department Bangkok Metropolitan Administration)	Thailand	20. 10. 30.

R&D for firefighting technologies

Legal grounds : Fire-Fighting Industry Promotion Act
KFI focuses on R&D tailored to each on-site situation, carries out national R&D initiatives, and promotes R&D in both industry and academia.

Basic technology and commercialization research
- Basic research on combustion and fire, including fire experiments in near-real settings and validation research to boost the credibility of safety-level evaluation
- Research on technologies for commercialization and tailored support throughout the cycle of product design, production, and commercialization

Institutional research, including the development of technology standard
- Development of tests and standards to rate firefighting goods and hazardous materials facilities
- Development of new technologies and products to remain relevant as firefighting and other technologies advance

Promotion of R&D and academic research
- Discovery of and awards to noteworthy research initiatives, including an award for best academic journal on the fire industry
- Hosting of international seminars that invite regional and international research teams and industrial organizations
- Publication of a firefighting technology research journal, as well as academic papers, to share and spread research results

Management of Government-Commissioned R&D Projects
- Managing national R&D projects in firefighting
- Planning mid- to long-term R&D projects in firefighting

Spearheading efforts to promote Korea's fire industry, KFI will secure national safety through the promotion of the fire industry and quality improvement of firefighting facilities.

Great Deep Railway Disaster Response Tech Research Group

KRRI Korea Railroad Research Institute

Development of Safety Response Measures for High-Risk Disaster Response Technology in Great Deep Railway

Vision

Reducing human casualties by 30% through core safety technology development

Goals

- Provide safe areas within 3 minutes
- Provide Smart evacuation, rescue system
- Development AI real-time integrated safety managing system

Core Technology

Detecter / Estimator

Development of Fire Propagation Estimation Technology Based on Smart Detection Technology
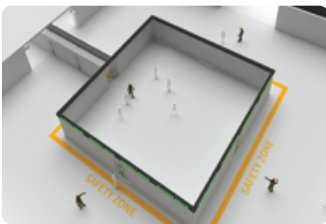
Response Measures

Smart Pathway System / Evac Training With Augmented Devices

Integrated Management System

Data Management Standard Architecture of DB

Smart Screen Pathway Design

Prototype of Evac. Guide Robot

Augmented Reality Training

Digital Twin Integrated Safety Management

Primary & Collaborative Inst

Primary Inst   KRRI, KORAIL

Collaborative Inst   KIMM, KICT, Urbanlife network, KETI, Kaier Ltd, Hyunsung Ltd, Corners Ltd, ICTR, Humetro, Pluxity Ltd, Eumtech Ltd, Goguryo Eng. Ltd, Papaya Ltd, Osan UNIV, Changwon UNIV, Seoultech UNIV, Gachon UNIV, University of Seoul

Ministry of Land, Infrastructure and Transport

KAIA Korea Agency for Infrastructure Technology Advancement

13th
Asia-Oceania Symposium on Fire Science & Technology 2024

October 21–25, 2024