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Editorial

Guest Editorial: Special Issue on Advances in Evacuation Modelling

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Evacuation models are currently employed for the design and assessment of the life safety conditions of buildings, infrastructure and outdoor areas threatened by fire. Over the years, several modelling methods, based on different approaches and assumptions, have been developed and used in the context of fire safety engineering [1, 2].

The purpose of this special issue of *Fire Technology* is to present to the broad fire protection community a selection of papers which include fundamental enhancements for the evacuation modelling field. Following an open call for papers, eleven articles have been included in the special issue (55% acceptance rate) given their significant contribution to advancing the field of evacuation modelling.

The first two papers present novel multi-scale modelling approaches addressing the increasing scale of represented incidents and the speed at which analysis is completed. Chooramun et al. [3] present a hybrid scale discretization applied to evacuation scenarios at urban scale. Richardson et al. [4] developed a multi-scale evacuation model able to investigate microscopic and macroscopic evacuation dynamics. Both papers allow the investigation of the evacuation process in an efficient manner given the possibility to effectively analyse data and allocate computational resources.

The following four papers focus on improving the theoretical basis for developing evacuation models for fires at both building and urban scales. The paper by Chu et al. [5] considers the effect of knowledge, roles and individual behaviour on evacuation and their incorporation in simulation tools. Another key behavioural aspect is discussed in the paper by Kinsey et al. [6], which examines the impact of cognitive biases on decision making during fire evacuation. The papers by McLen-

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nan et al. [7] and Nguyen et al. [8] focus on the behavioural factors affecting evacuation in the case of wildfire threats.

The relationship between experimental data-sets and their use for the development and validation of evacuation models is discussed in three papers presenting novel evacuation data collection and analysis methods. Hagwood et al. [9] discuss the adoption of the Hawkes self-exciting point process to obtain a minimum stair width which compensates for human interaction. Imanishi and Sano [10] present a large data-set on walking trajectories in theatre evacuation drills including over 100,000 data points. Bode and Codling [11] make use of virtual reality technology to carry out a crowd evacuation experiment to study the factors affecting pre-evacuation delays.

Finally, this special issue also includes studies which address a broader range of fire and evacuation scenarios. Li et al. developed a simulation tool able to combine different modelling layers to simulate evacuation from wildland-urban interface fires [12]. Musharraf et al. [13] discusses the validation of a human behaviour model representing intelligent agents in case of offshore emergencies.

This special issue of *Fire Technology* demonstrates that the evacuation modelling field is evolving and expanding. The use of new modelling approaches as well as novel technologies to collect behavioural data represent a great opportunity for the fire safety engineering community. There is indeed a clear trend that evacuation models are becoming more representative of real-world conditions, more flexible, applicable to a larger variety of fire evacuation scenarios and subjected to improved validation testing. The guest editors of this special issue feel that the papers published represent an important step for the further progression of the evacuation modelling field.

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