



Guest Editorial: The Significance of Pedestrian and Evacuation Dynamics

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The past decade has provided numerous examples of the devastation that can occur when hazards intersect with human vulnerability, from the tragic loss of life in the 2001 WTC terrorist attack, to Hurricane Katrina, and, more recently, in the ongoing devastation of post-earthquake/tsunami Japan as they struggle to contain the meltdown of a nuclear reactor. The focus of this journal, fire, kills thousands of people in structures around the world, and motivational events, in particular, remind us of the repeated and on-going dangers that arise in specific contexts, such as crowded nightclubs (e.g., the 2003 Station nightclub in Rhode Island and the 2009 Lame Horse nightclub in Russia) or in communities in the wildland/urban interface (e.g., the 2009 Black Saturday bushfires in Victoria, Australia). Pedestrian hazards, such as the constrained conditions that led to the 2010 Love Parade incident in Germany where individuals were crushed outside of a pedestrian tunnel, also continue to cost lives year after year.

Regardless of the specific nature of the hazard—earthquake, hurricane, flood, crowding, or fire—one factor unifies them all: the potential loss of human life. Although it is often a key role of emergency managers and fire safety engineers to design or evaluate engineering and egress systems to ensure life safety, research, guidance and techniques remain focused on the assessment of the hazard itself and less on human response before, during, and after a crisis event. Rapidly aging populations in some parts of the world, building design innovation and growth, and the egress challenges of the disabled require that effective management procedures and safety designs be achieved through a better understanding of human behavior and movement in a variety of incident scenarios.

This special issue includes nine articles that cover a variety of topics on pedestrian and evacuation dynamics from a wide range of geographical locations around the world. Over half of the articles in this issue present much needed data, including articles that highlight influential factors of occupant elevator usage for evacuation (Kinsey, Galea and Lawrence), evacuation experiences of people with disabilities in historical buildings in Sweden (Kecklund et al.), evacuation characteristics of children (Larusdottir and Dederichs), and the flow capacity of emergency doors during evacuation conditions (Daamen and Hoogendoorn). As a complement to these data-focused articles, this issue also contains a paper by Saadat, Teknomo and Fernandez that presents a unique technique aimed at reducing the effort necessary to analyze pedestrian movement and evacuation data.

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It is also important for our community to discuss ways to improve the simulation tools used to assess pedestrian movement or evacuation as well as the codes and regulations put in place to ensure cost-effective and safe structural and procedural design. Two articles featured in this issue are devoted to the improvement of the computational tools, specifically focusing on the introduction of a new computer evacuation model that can simulate fire combustion products and their influence on human movement (Fang et al.) and an effort to increase the transparency of current pedestrian and evacuation simulation techniques (Rogsch and Klingsch). Finally, an additional two articles discuss current hot topics in evacuation procedural design: the use of elevators for evacuation from a U.S.-based perspective (Bukowski) and the policy of evacuation versus defend in place from an Australian perspective (Johnson, Johnson and Sutherland).

This special issue presents a wide range of topics important to the understanding of pedestrian movement during routine conditions and evacuation during emergencies. These articles demonstrate both the diversity of concepts relevant to the field of pedestrian and evacuation dynamics; ranging from architecture, engineering, and mathematics, to sociology, human factors, and psychology; as well as the techniques used to collect data, including behavioral experiments, surveys, observations/drills, and focus groups. This issue demonstrates the value of human-focused data, and in turn, encourages analysts to pay equal attention to both the physical and the human sides of performance-based analyses and researchers to continue fostering new and innovative ways to understand the social world around them.