Foreword

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Biographical notes: Dušan Teodorović is Professor at the Faculty of Transport and Traffic Engineering, University of Belgrade, Serbia and Professor Emeritus at the Virginia Tech, USA. He holds degrees in Transportation Engineering, including a PhD from the University of Belgrade in 1982. Dr. Teodorović is elected member of the Serbian Scientific Society and Academy of Engineering Sciences of Serbia. His research interests include transportation networks, transportation planning, and traffic control with a particular emphasis on the development and application of appropriate models based on operations research and/or artificial intelligence techniques.

The special issue theme *Transportation Disaster and Degradation Management* has been selected to emphasise the importance of analysing, studying, modelling and simulation of various real-world problems including sudden degradation of transportation systems, transportation networks reliability, emergency response, evacuation strategies, crowd dynamics, urban, highway, and air traffic congestion mitigation, and location and routing of hazardous materials. The special issue brought together researchers and practitioners, acknowledged experts in the field from Japan, Taiwan, the USA, Italy, New Zealand, and UK dealing with *Transportation Disaster and Degradation Management* problems.

In their paper 'Disaster and degradation management: relevance of the concept of flexibility', Professor Morlok and Chang of the University of Pennsylvania presented the case that the concept of flexibility is especially important to the subject of disaster and degradation management in transportation systems. The authors addressed the kinds of issues that disasters create, and the scope of flexibility analysis. The adequate examples are also given in the paper.

Road network unreliability is analysed in Professor Nicholson's paper 'Road network unreliability: impact assessment and mitigation'. In his paper, Professor Nicholson of the University of Canterbury discussed the two sources of unreliability (*i.e.*, variations in the supply and/or demand) and described the methods for assessing and mitigating the impacts of degradation of both inter-urban and urban road networks. The focus of the paper is upon fundamental issues, including methodological problems.

Many tragic events in over-crowded situations have highlighted the importance of the research of pedestrian behaviour under emergency conditions. In his paper 'Competitive egress behaviour: a fuzzy logic-inspired microscopic model', Professor Dell'Orco, of the Technical University of Bari proposed a microscopic model of crowd evacuation, that incorporates the fuzzy perception and anxiety embedded in human reasoning. The comparison with the existing models is also provided in the paper.

Dr. Still of the Crowd Dynamics Ltd. is the author of the paper 'Review of pedestrian and evacuation simulations'. The author examined the fundamental principles of pedestrian and evacuation simulations. He also guided the reader towards a better understanding of crowd dynamics and evacuation analysis. The paper is concluded with a checklist for choosing an evacuation analysis system.

Maintaining the reliability of an airline timetable is one of the key issues in operating an airline. The on-time performance of flights is usually adversely affected by unexpected events, such as bad weather and crowded runways. Professors Hsu *et al*. of the National Chiao Tung University studied flight-delay propagation problem in their paper 'Flight-delay propagation, allowing for behavioural response'. The applicability of the model developed in the paper is presented by the corresponding numerical example. The flight schedules and delay data used in the paper were collected from China Airlines.

Network flow models aim to explain interactions between traveller's choice behaviour in a degraded network and the performance of the transportation network. Professor Asakura of the Kobe University is the author of the paper 'Requirements for transport network flow models used in reliability analysis'. He discussed in his paper the requirements of transport network flow models that are used for network reliability analysis. A numerical example based on the actual road network data is presented in the paper.

Professor Abkowitz of the Vanderbilt University, Allen *et al.*, and McSweeney of the Battelle Memorial Institute are the authors of the paper 'An evolving paradigm for managing hazardous materials transportation risk'. They presented a review of traditional risk assessment methods and practices as applied to the transport of hazardous materials. The authors also described a methodology for constructing a systematic, integrated risk assessment process for addressing natural and man-made disasters. The methodology is then applied to various classes of hazardous materials transported by highway.

The author of the paper 'A framework for evaluating risk to the transportation network from terrorism and security policies' is Assistant Professor Murray-Tuite of the Virginia Polytechnic Institute and State University. She presented a framework for evaluating risk to the road transportation network from direct targeting by terrorists. Risk is measured in terms of capacity losses between an origin and a destination. Using the proposed framework, decision-makers can better evaluate the costs of both terrorist activities and security measures.

Dr. Rakas of the National Center of Excellence for Aviation Operations Research (NEXTOR), University of California at Berkeley and Myron Hecht of the Aerospace Corporation are the authors of the paper 'Airport availability modelling: a different perspective'. The authors proposed a systems-level approach to airport and runway availability assessments and prediction. They also addressed the problem of the aging or continuously degrading aviation infrastructure. With the proposed methodology an analyst can precisely quantify the additional level of airport availability achieved

by upgrading or adding new pieces of the Communication, Navigation and Surveillance (CNS) equipment at airports, and therefore better accommodate critical operating conditions.

The primary goal of this special issue is to acquaint the reader with some of the innovative ideas, models, methods and tools related to the *Transportation Disaster and Degradation Management* and to indicate the directions for future research in this area. I am very grateful to colleagues who reviewed the preliminary versions and the revised papers submitted for publication in this issue. I am also very thankful to Professor Mili, the North American Editor of the *International Journal of Critical Infrastructures*, who gave me the opportunity to be the guest editor of this special issue. It is hoped that this special issue will further motivate research in these exciting areas of transportation science.