

During the past two decades, it has been generally acknowledged that

- life-cycle bridge analysis can be a systematic tool to address efficient and effective bridge management under uncertainty
- life-cycle management at the bridge network level can lead to an improvement in the allocation of limited financial resources, ensuring the safety and functionality of the bridge network
- life-cycle management of bridges and bridge networks based on resilience and sustainability can improve their resistance and robustness to extreme events such as earthquakes, tsunamis, floods, and hurricanes
- bridge management should consider the impact of environmental conditions and climate change

This book addresses important concepts and approaches developed recently on bridge safety, maintenance, and management in a life-cycle context. Bridge life-cycle performance and cost analysis, prediction, optimization, and decision making under uncertainty are discussed. The major topics include bridge safety and service life prediction; bridge inspection and structural health monitoring; bridge maintenance; life-cycle bridge and bridge network management; optimum life-cycle bridge management planning; resilience and sustainability of bridges and bridge networks under hazards; and bridge management considering climate change. By providing practical applications of the presented concepts and approaches, this book can help students, researchers, practitioners, infrastructure owners and managers, and transportation officials to build up their knowledge of life-cycle bridge performance and cost management at both project level and network level under various deteriorating mechanisms, hazards, and climate change effects.

**Dan M. Frangopol** is the inaugural holder of the Fazlur R. Khan Endowed Chair of Structural Engineering and Architecture at Lehigh University. He is widely recognized as a pioneer in the field of life-cycle engineering. His main research interests are in the development and application of probabilistic concepts and methods to civil and marine structures under various types of hazards. Dr. Frangopol is the Founding President of both the International Association for Bridge Maintenance and Safety (IABMAS) and the International Association for Life-Cycle Civil Engineering (IALCCE). He is the founder and editor-in-chief of *Structure and Infrastructure Engineering*. His research and professional service have garnered numerous awards from ASCE, IABSE, IASSAR, ISHMII, and other professional organizations. He holds 4 honorary doctorates and 14 honorary professorships. He is a member of the National Academy of Construction of the United States, a foreign member of the Academy of Europe (London), a foreign associate of the Engineering Academy of Japan, a foreign member of the Royal Academy of Belgium, an honorary member of the Romanian Academy, an honorary member of the Romanian Academy of Technical Sciences, and a distinguished member of ASCE.

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MANAGEMENT IN A LIFE-CYCLE CONTEXT

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