

Plenary Lectures



Dan M. Frangopol

The Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture

Professor of Civil Engineering, Department of Civil and Environmental Engineering,

ATLSS Center, Lehigh University, Bethlehem, PA 18015-4729, USA

<http://www.lehigh.edu/~dmf206>

Extending the Service Life of Civil and Marine Structures: Role of Monitoring, Probabilistic Life-cycle Management and Risk-based Decision Making

Biography

Dan M. Frangopol is the inaugural holder of the Fazlur R. Khan Endowed Chair of Structural Engineering and Architecture at Lehigh University. Before joining Lehigh University in 2006, he was Professor of Civil Engineering at the University of Colorado at Boulder, where he is now Professor Emeritus. His main research interests are in the development and application of probabilistic concepts and methods to civil and marine engineering. He is recognized as a leader in the field of life-cycle engineering of civil and marine structures under various types of hazards. Dr. Frangopol is the Founding President of the International Association for Bridge Maintenance and Safety (IABMAS) and International Association for Life-Cycle Civil Engineering (IALCCE). He has authored/co-authored 3 books, more than 50 book chapters, and over 420 articles in archival journals including 11 prize winning papers. He is the Founding Editor of Structure and Infrastructure Engineering and of the Book Series Structures and Infrastructures. Dr. Frangopol is the recipient of several medals, awards, and prizes, from ASCE, IABSE, IASSAR, SAE and other professional organizations. He has served as a consultant or advisor to companies in North America, Asia, and Europe. He holds 4 honorary doctorates and 14 honorary professorships from major universities. He is an Elected Member of the US National Academy of Construction, 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.

Abstract

Structural deterioration can pose tremendous risk to the functionality, serviceability, and safety of civil and marine structures, considerably limiting their service life. To extend the life-cycle of existing structures under deterioration, rational life-cycle management should be conducted accounting for various uncertainties arising from loads, resistance, and modeling. Compared to conventional inspection methods that are sometimes disruptive and costly, structural health monitoring provides a novel and cost-efficient approach to reducing uncertainties and ultimately facilitating the decision-making process for realizing structural longevity. In this plenary lecture, recent accomplishments in the integration of monitoring, probabilistic life-cycle management and risk-based decision making for extending the service-life of civil and marine structures are presented.