MICHEL GHOSN

In step with the abounding vitality of the time, structural engineer **Fazlur Rahman Khan** (1929-1982) ushered in a renaissance in skyscraper construction during the second half of the 20th century. Fazlur Khan was a pragmatic visionary: the series of progressive ideas that he brought forth for efficient high-rise construction in the 1960s and '70s were validated in his own work, notably his efficient designs for Chicago's 100-story John Hancock Center and 110-story Sears Tower -- the tallest building in the United States since its completion in 1974.

Fazlur Rahman Khan

Lehigh endowed a chair in structural engineering and architecture and has established this lecture series in Khan's honor. It is organized by **Professor Dan M. Frangopol**, the university's first holder of the Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture, and sponsored by the Departments of Civil & Environmental Engineering, and Art, Architecture & Design.

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ATLSS

2024 Khan Distinguished Lecture Series

The Fazlur Rahman Khan Distinguished Lecture Series honors Dr. Fazlur Rahman Khan's legacy of excellence in structural engineering and architecture

Initiated and Organized by **PROFESSOR DAN M. FRANGOPOL**
The Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture
Department of Civil and Environmental Engineering, ATLSS Engineering Research Center,
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MICHEL GHOSN

Professor of Civil Engineering
The City College of the City University of New York / CUNY
New York, NY

"Design and Safety Assessment of Structures and Infrastructure Systems Subjected to Extreme Events in a Changing Climate"

Tuesday, October 29, 2024 – 4:30 pm EDT

Lecture will be live streamed, must register here for livestream link

http://www.lehigh.edu/frkseries

Dr. Michel Ghosn's expertise is in the risk assessment and the reliability analysis of civil structure and infrastructure systems. He has worked on the development of criteria and Load and Resistance Factor Design (LRFD) procedures for quantifying bridge redundancy which formed the basis for the system factors recommended in the current American Association of Highway and Transportation Officials (AASHTO) Manual for Bridge Evaluation (MBE). He has also worked on developing models for the design of bridges for extreme events including seismic, wind, ship collisions and scour and their combinations. His work on the development of live load models for highway bridges led to the implementation of the current permit load factors in the AASHTO MBE. These models have also been widely applied in bridge engineering practice and adopted by researchers and practicing engineers world-wide. Professor Ghosn is currently serving on several American Society of Civil Engineers (ASCE) committees working on developing procedures for accounting for the effects of climate change during the design and safety assessment of buildings and other structures. Prof. Ghosn's overall accomplishments have been recognized through several awards from national and international engineering research and professional associations.

Design and Safety Assessment of Structures and Infrastructure Systems Subjected to Extreme Events in a Changing Climate. Civil infrastructure systems are exposed to various types of human-made, environmental, and climatic hazards within their service lives. Reliability-based approaches and probabilistic risk-informed methods have long been used for assessing the safety of such systems and developing design standards and specifications to account for the random nature of these hazards, their intensities, rates of occurrence, and possible compounding effects. Specifically, current design standards provide reliability-calibrated design load maps and tables as well as load combination factors for use in engineering practice during a structure's safety assessment process. These maps and associated procedures are based on historical data assuming that the underlying climatic processes are unchanging over time such that observed variations in the historical data are only random oscillations around underlying stationary statistical properties. However, ageing processes, growth in economic activities, and climate change are causing increases in the frequencies and intensities of human-made and environmental hazards, raising the risk to infrastructure systems and their users. This presentation will review the fundamental principles behind structural code developments and their underlying assumptions. It also examines analytical methods to assess the safety of structural systems accounting for the nonstationary nature of climatic hazards. The presentation will present approaches for adjusting current structural design specifications in view of anticipated climate change scenarios. Numerical examples will illustrate the application of these approaches for the safety assessment and the design of structural systems.

FAZLUR RAHMAN KHAN (1929 - 1982) One of the foremost structural engineers of the 20th century, Fazlur Khan epitomized both structural engineering achievement and creative collaborative effort between architect and engineer. Only when architectural design is grounded in structural realities, he believed — thus celebrating architecture's nature as a constructive art, rooted in the earth — can "the resulting aesthetics … have a transcendental value and quality." His ideas for these sky-scraping towers offered more than economic construction and iconic architectural images; they gave people the opportunity to work and live "in the sky." Hancock Center residents thrive on the wide expanse of sky and lake before them, the stunning quiet in the heart of the city, and the intimacy with nature at such heights: the rising sun, the moon and stars, the migrating flocks of birds. Fazlur Khan was always clear about the purpose of architecture. His characteristic statement to an editor in 1971, having just been selected Construction's Man of the Year by *Engineering News-Record*, is commemorated in a plaque in Onterie Center (446 E. Ontario, Chicago): ***"****The technical man must not be lost in his own technology. He must be able to appreciate life; and life is art, drama, music, and most importantly, people."*

SEI ASCE STRUCTURAL ENGINEERING INSTITUTE Lehigh Valley Chapter

1 PDH will be awarded to eligible attendees for each lecture
(minimum webinar participation time of 55 minutes is required)

Please contact the Khan Chair office at 610-758-6123 or Email: infrk@lehigh.edu with any questions.