AHSAN KAREEM

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,
Lehigh University
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AHSAN KAREEM

Robert M. Moran Professor
NatHaz Modeling Laboratory
University of Notre Dame, Notre Dame, IN

"Swaying Skyscrapers: Unveiling the Dance Between Wind and Tall Buildings Through the Ages"

Wednesday, March 6, 2024 – 4:30 pm EST

Lecture will be live streamed, must REGISTER HERE for live stream link

http://www.lehigh.edu/frkseries

Ahsan Kareem is the Robert M. Moran Professor of Engineering and the **Director** of the NatHaz Modeling Laboratory at the University of Notre Dame. His research uses computer models, laboratory, and full-scale experiments to study the dynamic effects of environmental loads under winds, waves, and earthquakes to understand, predict, and mitigate the impact of natural hazards on the constructed environment. Dr. Kareem received his Ph.D. from Colorado State University, M.Sc. from the University of Hawaii/MIT, and B.Sc. (valedictorian) from the West Pakistan University of Engineering and Technology. He is a Distinguished Member of ASCE and a Member of the US National Academy of Engineering and also a foreign member of the Engineering Academies of India, China & Japan. (wikipedia.org/wiki/Ahsan_Kareem)

Swaying Skyscrapers: Unveiling the Dance Between Wind and Tall Buildings Through the Ages. The seminar will focus on addressing the three elements of tall buildings' life cycle from design, and construction to performance evaluation. It summarizes the history of wind effects on tall buildings from the design of the World Trade Center Towers to the present-day skyscrapers and beyond. From earlier studies at the National Physical Laboratory in the UK involving the World Trade Center Towers, it was realized that it was essential to model the inflow that was reflective of the atmospheric boundary layer rather than a uniform flow in an aeronautical tunnel. At that juncture, the dynamic response was evaluated using base-pivoted aeroelastic models while a search for a more expeditious means of assessing wind loads was in progress, which led to the development of various force balances. In this context, a general overview of the basic techniques for the quantification of wind loads and their dynamic effects using analytical, experimental, computational fluid dynamics (CFD) and model-based and data-driven simulation schemes, database-enabled platforms, code and standards-based procedures and lessons from full-scale monitoring will be presented in a historical perspective. The issue of human sensitivity to motion will be described from its early day experiments by Fazlur Rahman Khan to current motion simulators. This will be followed by a synopsis of the emerging frontiers in CFD from isolated buildings to cityscapes, mesoscale to micro-scale, shape and topological optimization, the vulnerability of glass cladding in extreme winds, the role of organic damping and damping devices for the mitigation of building motion.

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.