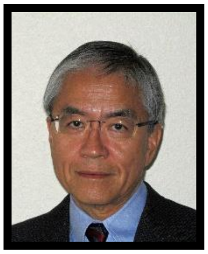

P. BENSON SHING

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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Spring 2021 (Virtual) Khan Distinguished Lecture

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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P. BENSON SHING

Professor, Department of Structural Engineering, University of California, San Diego, CA

"Understanding the Seismic Performance of Structural Systems through Large-scale Experiments and Computational Simulations"

Thursday, April 15, 2021 – 4:30 pm

Via Zoom (click here to register)
http://www.lehigh.edu/frkseries

P. Benson Shing is a professor of Structural Engineering at the University of California San Diego. He earned his BS, MS, and Ph.D. degrees from the University of California at Berkeley. His recent research focuses on the seismic performance of reinforced concrete and masonry structures, and the advancement of design and assessment methods through computational modeling and large-scale laboratory experiments. His earlier work included the development of hybrid simulation methods for seismic assessment of structural systems. His research has been supported by a number of agencies, including the NSF, NIST, California Department of Transportation, Colorado Department of Transportation, and the Applied Technology Council with funding from NIST and FEMA. He is a member of TMS 402 Committee and ASCE 41 Masonry Subcommittee.

Understanding the Seismic Performance of Structural Systems Through Large-scale Experiments and Computational Simulations. The development of design standards for seismic force resisting systems has been relying on data from numerical simulations and laboratory experiments for a long period of time. However, these simulations have often been performed with highly simplified computational models either because of their computational efficiency or because of the lack of more refined modeling options. Moreover, most experimental studies focused on isolated structural elements or subassemblages, which were typically tested to a state of severe damage but not to the point of incipient collapse. It is well recognized that the performance of a structural system in an earthquake depends on how the structural elements interact, which dictates the resulting inelastic mechanisms, as well as on the alternate load paths and redundancy provided in the system. To compensate for the lack of system response data for model validation, design specifications and evaluation criteria often have to have added conservatism. This may not only result in less economical systems but also a lack of uniform safety level across structural materials and systems. To develop reliable performance-based seismic design guidelines, accurate and efficient computational models are essential for predicting the damage states as well as accessing the possibility of collapse of a structural system in an earthquake. Computational modeling of the response of reinforced concrete and masonry structures for such purpose is especially challenging as these structures can develop complex inelastic mechanisms, including the cracking and crushing of concrete/masonry, the yielding, buckling, and fracture of reinforcing bars, and the interaction between the two materials. This lecture demonstrates the importance of structural system testing and refined computational modeling to the advancement of design standards for reinforced masonry structures, and presents some recent work along this direction including major findings.

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 STRUCTURAL ENGINEERING INSTITUTE ASCE Lehigh Valley Chapter

1 PDH will be awarded to eligible attendees for each lecture

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