LEHIGH UNIVERSITY | P.C. Rossin College of Engineering and Applied Science

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2021 FAZLUR RAHMAN KHAN DISTINGUISHED LECTURE SERIES

Honoring a legacy in structural engineering and architecture

Thursday, February 18, 2021
4:30 P.M. EST
Jeanne Gang
Founding Principal and Partner
Studio Gang
Chicago, IL

CROSSING DOMAINS

Studio Gang's unique design approach is predicated on interdisciplinary collaboration with expert partners ranging from engineers and ecologists to artists and journalists. In this lecture, Jeanne will discuss how this deep and sustained engagement across fields has resulted in the material, spatial, and aesthetic innovations that define award-winning projects like the supertall St. Regis Chicago tower, the city's third tallest building, and the Arcus Center for Social Justice Leadership, which unites traditional cordwood masonry practices with contemporary design and building technologies.

Thursday, March 11. 2021
4:30 P.M. EST
Jack Moehle
Professor of the Graduate School
University of California at Berkeley
Berkeley, CA

PERFORMANCE-BASED SEISMIC DESIGN OF TALL BUILDINGS

Performance-based seismic design of tall buildings in the western United States began in earnest shortly after the turn of the 21st century. Although even the first designs were subject to independent peer review, there were no guidelines or accepted criteria for how to conduct and review a performance-based design, with the result that similar buildings were often designed to satisfy distinctly different criteria. Guidelines and building code provisions were soon developed to improve uniformity in design approaches and to foster the adoption of the performance-based approach. This lecture will review the development of performance-based seismic design of tall buildings, document a typical design application, and summarize results of over a decade of experience in tall building designs.

Thursday, April 15, 2021
4:30 P.M. EST
P. Benson Shing
Professor, Department of Structural Engineering
University of California
San Diego, CA

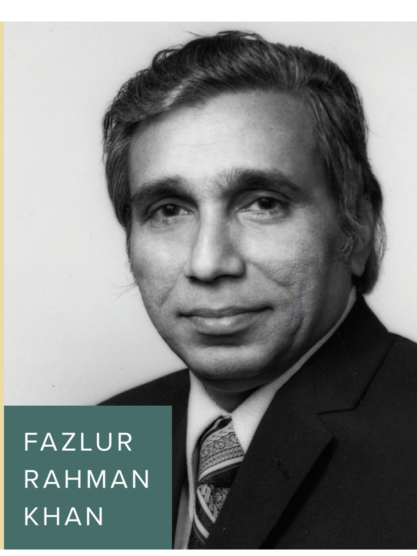
UNDERSTANDING THE SEISMIC PERFORMANCE OF STRUCTURAL SYSTEMS THROUGH LARGE-SCALE EXPERIMENTS AND COMPUTATIONAL SIMULATIONS

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.

ABOUT THE KHAN SERIES

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 Willis (formerly Sears) Tower — the tallest building in the United States since its completion in 1974.

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 inaugural 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.



FAZLUR RAHMAN KHAN

This lecture series is sponsored by:
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1 PDH will be awarded to eligible attendees for each lecture.

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