



2016

### FAZLUR RAHMAN KHAN DISTINGUISHED LECTURE SERIES

*Honoring a legacy in structural engineering and architecture*

Presentations will be held in  
Whitaker Lab 303 at Lehigh University

Receptions to precede events starting at 4:10 P.M.

<http://www.lehigh.edu/frkseries>

**Friday, March 4<sup>th</sup>, 2016**

4:30 P.M.

“Performance-based Design: What, How, When,  
Why, and Why Not to Use It”

**Friday, April 15<sup>th</sup>, 2016**

4:30 P.M.

“Lessons Learned”

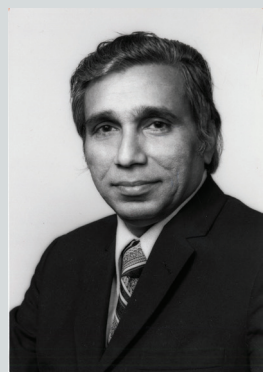
**Friday, April 22<sup>nd</sup>, 2016**

4:30 P.M.

“Structural Use of FRP Composites in Construction:  
Past Achievements and Future Opportunities”

#### 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 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.



*Ronald O. Hamburger*  
Senior Principal, Simpson  
Gumpertz & Heger Inc.,  
San Francisco, CA

#### PERFORMANCE-BASED DESIGN: WHAT, HOW, WHEN, WHY, AND WHY NOT USE IT.

Performance-based design is a powerful alternative approach to design in accordance with the building code. It enables the use of structural materials and systems for which building code requirements do not presently exist; as well as the use of systems and materials beyond the limits prescribed by the building code. It can also allow design of buildings capable of better or more reliable performance than would be obtained strictly by adherence to the code. However, the use of performance-based design entails a number of risks that both the design professional and developer need to be aware of. Mr. Hamburger will provide details of the basic process, its benefits, and the associated risks.

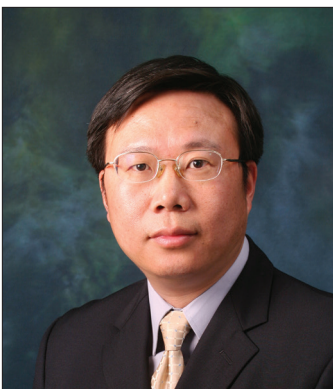


*John Zils*  
Senior Structural Consultant,  
Skidmore Owings & Merrill  
LLP, Chicago, IL

#### LESSONS LEARNED.

Fazlur Khan was a visionary and innovator in building design during a very exciting period in the evolution and development of tall building and long span structural systems. Upon joining Skidmore Owings & Merrill in 1960, Dr. Khan immediately recognized that the computer could provide unprecedented analytical and design power that would revolutionize the design profession. He convinced SOM to purchase a computer for the structural department which then provided him with the means to explore structural behavior in great depth and develop the many innovative structural systems attributed to him.

This lecture will attempt to articulate and illustrate some of the lessons learned and the ideas used in various projects. Dr. Khan was an innovative and brilliant engineer but his legacy will also include the impact of his ability to communicate and teach these lessons to all of us. Even though his professional career of 22 years was relatively short, his impact on the building profession and those who came in contact with him is enormous.



*Jin-Guang Teng*  
Chair Professor of  
Structural Engineering, The  
Hong Kong Polytechnic  
University, Hong Kong,  
China

#### STRUCTURAL USE OF FRP COMPOSITES IN CONSTRUCTION: PAST ACHIEVEMENTS AND FUTURE OPPORTUNITIES.

Fiber-reinforced polymer (FRP) composites are formed by embedding continuous fibers (e.g. carbon, glass and aramid fibers) in a polymeric resin matrix. This presentation will provide a review of the major achievements in the structural use of FRP composites in construction over the past two decades, covering both research and practical implementations. A strong emphasis will be placed on the optimal use of FRP composites to enhance the performance of structures, which often means that FRP composites need to be used in combination with traditional materials such as steel and concrete. In the area of strengthening, externally bonded FRP reinforcement is now a mainstream technology. In the area of new construction, many innovative structural forms enabled by FRP composites are being explored. The presentation will also examine future opportunities and challenges in the area.



**STRUCTURAL  
ENGINEERING  
INSTITUTE**  
Lehigh Valley  
Chapter

**1 PDH will be awarded to  
eligible attendees  
for each lecture.**