Jeremy Isenberg

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.

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ATLSS

Spring 2008 Khan Lecture Series

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

Organized by: **DAN M. FRANGOPOL**
Fazlur Rahman Khan Endowed Chair of Structural Engineering and Architecture
Department of Civil and Environmental Engineering, ATLSS Center, Lehigh University
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Jeremy Isenberg

PE, Past-President and CEO
Weidlinger Associates, Inc., New York, NY

"Structural Design for Security - Past Accomplishments and Future Directions"

Friday, March 14, 2008 – 4:10 pm

Location: Sinclair Lab Auditorium, Lehigh University, 7 Asa Drive, Bethlehem, PA

http://www.lehigh.edu/frkseries

DR. JEREMY ISENBERG: Dr. Isenberg received an undergraduate degree in Civil Engineering at Stanford University and PhD in Structural Engineering at the University of Cambridge, England, where he was a Fulbright Scholar. Following service as a Lieutenant, Civil Engineer Corps, USNR, he began a consulting career in computational modeling of soil-structure interaction and structural response to explosions and earthquakes. His early work in computational plasticity and absorbing boundaries at Weidlinger Associates contributed to such projects as design of super-hard missile silos. He also advanced understanding of pipeline response to traveling seismic waves and fault offsets, undertaking a field experiment in which instrumented pipe segments were built across a strand of the San Andreas Fault. He is a licensed Professional or Civil Engineer in four states. He is the author of over 60 technical publications and recipient of several awards from ASCE, including the Ernest E. Howard and C. Martin Duke Awards and the Tewksbury Award of the ASCE Structural Engineering Institute (SEI). He is a past President of the Board of Governors of SEI. He was elected to the US National Academy of Engineering in 1999 and is an Honorary Member of ASCE.

Structural Design for Security – Past Accomplishments and Future Directions

American response to the threat of terrorism began following the bombing in 1983 of the US Embassy and Marine Barracks in Beirut. The US Department of State instituted a program of structural hardening to protect US posts abroad. Starting with technical approaches that had been developed for Cold War threats, explosive testing and computational methods were adapted to identify and reduce hazards from chemical explosives of the type available to terrorists. Acts of terrorism within the United States, including the first World Trade Center bombing in 1993 and destruction of the Murrah Federal Building in Oklahoma City, prompted further technical developments that strived for protection while retaining architectural features including high ceilings, open sightlines and glass curtain walls. Public buildings such as courthouses and some iconic structures were strengthened. Following Sept. 11, 2001 the scope of protection widened to include bridges, tunnels and transportation terminals. Engineering for protection benefited from lessons learned by the earthquake engineering community. These lessons include the importance of detailing; the need for creativity within consensus-based standards; and performance-based design criteria within a framework of formal risk assessment. Standards have been prepared by such public agencies as the General Services Administration. Development of design guidelines to resist progressive collapse is in process. There is discussion of closer coordination between structural design and fire protection. The potential cost of strengthening the large inventory required prioritizing projects using screening and probabilistic risk assessment methods.

This lecture will trace the development of technology for protecting civilian structures against explosive threats and illustrate applications with examples from the open literature. Suggestions as to future directions will be offered.

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."**

Please contact Leslie J. Ladick at 610-758-6123 or Email: ljl2@lehigh.edu with any questions.