# CCHRB 2011 Seminar on Tall Buildings

CCHRB 2011 Spring Seminar
Wind Induced Building Movement
Chicago, Illinois
Thursday, June 9, 2011

**What: "Wind Induced Building Movement: The State of the Art of Measurement, Mitigation and Accommodation"**

The force of the wind causes movement of buildings of all heights, and often in ways that are not easily seen or understood. The effects of that movement cause both temporary and permanent changes in the materials, and in the performance of both the interior and exterior of a building. That movement is most usually most extreme and therefore most easily studied and understood in high rise buildings. This seminar will examine the state of the art of understanding of wind induced building movement on buildings. Although focus will be on tall buildings, much of what will be reviewed is applicable in varying degrees to mid-rise and low rise buildings as well.

This one-half day seminar will cover the state of the knowledge of four distinct and critical topics of wind induced building movement: 1) actual measurement versus predicted movement; 2) human response to building movement; 3) methods of mitigation of movement; and 4) methods of accommodation of movement.

Presentations will be by individuals with exceptional knowledge of these issues, and will be available to respond to questions from seminar attendees.

This seminar does not address issues of building movement caused by factors other than the wind, such as building settlement, thermal action, or materials change (such as creep).

**Who Should Attend:** Architects, interior designers, engineers, contractors, subcontractors, developers, building owners, property managers, those involved in the planning, design, construction, and operation of buildings of all types and heights, but especially high rises.

**Date:** Thursday, June 9, 2011

**Time:** 7:15 AM Check in of attendees begins, and continental breakfast is available. Please bring a photo ID, and allow adequate time to go through Building Security.

Program will start promptly at 8:00 AM, and conclude at 12:30 PM

# CCHRB 2011 Seminar on Tall Buildings

**Location:** Harris Bank Auditorium

3rd Floor
Harris Bank Building
115 South LaSalle Street
Chicago, Illinois

**Sponsor:** The Chicago Committee on High Rise Buildings (CCHRB)

**Co-sponsors:** Members of the following organizations can receive a discount on registration costs:

- Chicago Chapter of the American Institute of Architects (AIA)
- Association of Licensed Architects (ALA)
- Chicago Chapter Construction Specifications Institute (CSI)
- Council on Tall Buildings and the Urban Habitat (CTBUH)
- Structural Engineers Association of Illinois (SEAOI)
- American Institute of Steel Construction (AISC)

**Continuing Education:** Four hours of HSW continuing education credits are available for members of AIA. A certificate for 4 hours of continuing education will be provided upon request for others.

**Cost:** Includes continental breakfast:

Early registration option (register received before May 15th, 2011)

$100.00 Member of CCHRB or of a co-sponsoring organization

$125.00 Non-members

Registration received on or after May 15th, 2011

$125.00 Members of CCHRB or of a co-sponsoring organization

$150.00 Non-members

**On-Line Registration:** Online registration is available. Call Robert Grupe at 312-371-7897 if you need assistance with on-line registration.

# CCHRB 2011 Seminar on Tall Buildings

**Mail-in Registration:** Please mail Registration Form (with payment by check) to

Fred Moritz Treasurer, CCHRB
c/o Shiner and Assoc.
225 West Washington Street, Ste. 1625
Chicago, IL 60606

Mail-in registration form must be postmarked no later than May 14, 2011.

Call Robert Grupe at 312-371-7897 if you need assistance with mail-in registration.

**Check-In:** Please note that on-site check-in will begin starting at 7:15 AM on he day of the event. Please bring a photo I.D. and allow adequate time to pass through building security after entering the building. The event starts at 8:00 AM. A light continental breakfast (coffee, beverages, pastry) will be available prior to the start of the event.

**Additional Information:**

Mr. Robert Grupe CSI (312-371-7897)
Mr. Kim Clawson, AIA, CSI Mr.Kim.Clawson@gmail.com

**Presentations by:**

Dr. Tracy Kijewski-Correa, PhD
Phillip Rooney Assistant Professor, Department of Civil Engineering & Geological Sciences, University of Notre Dame

***Wind-Induced Response of Tall Buildings:*** *Closing the Gap between Design-Predictions and Full-Scale Behaviors - This session will start with traditional methods to tall building design for wind effects at various limit states. The next portion will be an introduction to wind tunnel testing and its necessity for*

*tall building design. Insights that can be gained from full-scale observations using various structural health monitoring technologies – using case studies of our various buildings instrumented worldwide. It will further look into wind tunnel testing, how it works, and why is it the current predominate method of analysis. The program will end with a discussion on using newer GPS technology and how it can provide precise data on how an actual structure reacts to wind loading.*

**Tracy Kijewski-Correa** is Linbeck Associate Professor and Associate Chair of the Department of Civil Engineering and Geological Sciences at the University of Notre Dame. Her graduate training as a structural engineer has specific focus on dynamic loadings on structures, with emphasis on wind loads, their dynamic effects on structures, and their condification. Her current research seeks to address 21st Century Civil Infrastructure Challenges using multi-disciplinary collaborations, advanced technologies and cyber-infrastructure. These efforts include an NSF-funded, full-scale monitoring program for signature buildings in three countries around the globe, including the world's tallest building, Burj Khalifa. Other activities include research in cyber-physical systems and embedded sensing, in collaboration with a multi-disciplinary, college-wide research team focused on wireless sensor networks for detection of damage in civil infrastructure and terrorist activities in major cities. In addition, Dr. Kijewski-Correa is a PI on two NSF-funded projects leveraging cyber-infrastructure to mitigate wind hazards on structures and to create new paradigms for open-sourcing the design of civil infrastructure. Recently, these efforts have been extended by Notre Dame's SAPC Program to include the seeding of CYBER-EYE: A Cyber-Collaboratory for National Risk Modeling and Assessment to Mitigate the Impacts of Hurricanes in a Changing Climate.

**Peter Irwin, Ph.D.**

RWDI: Rowan, Wilson, Davies Irwin
Guelph, Ontario Canada

***Wind, Tall Buildings and Human Comfort****. - Often one of the biggest challenges in the design of a tall building is keeping the wind-induced motions within acceptable limits for human comfort. This portion of the program will discuss the current state of the art in terms of comfort criteria, analytical and wind tunnel methods, use of motion simulators, and monitoring and anecdotal evidence from existing*

*buildings. Shaping strategies and supplementary damping systems for controlling motions will also be described.*

**Peter Irwin** began his career in aeronautical engineering in the UK but has been involved in wind research and consulting since completing his PhD in mechanical engineering at McGill University in 1974. After 5 years at Canada's National Research Council in Ottawa, where he was responsible for wind tunnel studies on a number of long span bridges, tall buildings and stadia, he helped form the world's first private wind tunnel testing and consulting firm in wind engineering. The firm, now known as RWDI, with offices in North America, Europe, the Middle East and Asia, has been responsible for the wind engineering of many iconic structures, including the Burj Khalifa, Taipei 101 and the Petronas Twin Towers. Peter has published numerous papers on wind engineering topics and helped craft wind load standards for the USA, Canada and ISO.

Mr. Robert Halvorson, SE, PE, FIStructE
Halverson and Partners Structural Engineers
Chicago, Illinois

***Mitigating Wind Induced Building Movements***. *– Traditional design standards called for stiffening the structure to withstand wind loading. The types and characteristics of building movements under wind loading will be described. Recently, active, rather than passive, designs to control building motion have been coming into play, and they call for a damping system. There are two types of commonly used damping systems: tuned mass dampers (TMD) and tuned liquid dampers (TLD). Both types will be described along with case studies on projects where they were used.*

**Robert A. Halvorson, SE, PE, FIStructE** leads the structural engineering practice of Halvorson and Partners. Bob, as he is known by most, is an industry leader in tall building design. Over a career spanning thirty years Bob has designed numerous tall buildings including the 71 story Allied Bank Plaza in Houston, the 49 story Hyatt Center and the 40 story One South Dearborn in Chicago, the 85 story Index Building in Dubai and the 88 story Central Market project in Abu Dhabi. His interest in building structures began with a summer job as a carpenter’s helper and continued through his formal studies at Cornell and Stanford. Bob began his career with Skidmore Owings & Merrill (SOM), serving in their

Chicago, Houston, New York and London offices. Bob founded Halvorson and Partners in 1996. The firm has offices and personnel in Chicago, Atlanta and Abu Dhabi with a total staff of 50 professionals.

Mr. Robert Grupe, CSI
USG Corporation

***Accommodating Wind Induced Building Movements***. *– While either stiffening the structure or using a dampening system, the buildings will still move. This part of the program will provide insight into architectural details theory that will accommodate wind induced building movement. Specific emphasis will be on interior finishes.*

**Bob** recently retired from USG after serving 38 years in various technical positions. While with USG, he managed a staff of registered architects and engineers that provided technical support to the industry. He is a board trustee for the Chicago Architectural Foundation, and was honored as a Senior Fellow of the Executive Board of the Design Futures Council. He has written several articles on gypsum system technology and provides training on related building sciences internationally.

Richard E. Fencl, AIA / CSI – LEED/APB+D
Gensler Associates

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***Open Panel Discussion.*** *- Mr. Fencl will moderate the panel discussion. During this time, the audience will be allowed to direct questions to the panelists. This facilitated session will also allow for delving deeper into certain elements of wind induced building movement. It may also serve as a platform to explore the other types of building movements that occur.*

**Richard Fencl** is the Technical Director for Gensler's North Central Region. Gensler, through its' "Architecture of Ideas philosophy" is one of the largest architectural and interior design firms in the world. Mr. Fencl's role focuses on the technical merit and quality assurance of the Firm's work and he brings nearly 40 years of practical know-how and architectural engineering to the profession through a broad range of projects.

Project Highlights include aquariums, university library and laboratory buildings, corporate research facilities, office buildings, hospitals and high rise projects – both worldwide as well as nationally.

Fencl is past Chairman of AIA Chicago's Technical Committee and of the Chicago Committee on High Rise Buildings. A guest lecturer within collegiate architectural programs, Mr. Fencl has also presented programs at AIA; AISC and ASHRAE National Conventions and has served on the editing boards for the Precast Concrete Institute and the Glass Association of North America.

Fencl currently Chair's the Chicago Building Envelope Council and serves on the Board of Directors for the Structural Engineers Certification Board.

A native of Chicago and a graduate of the University of Illinois in Urbana, Richard is a registered Architect in numerous states and certified with NCARB and LEED.

[This notice dated: April 15, 2011]