Institute Honors and Awards
Fellowship

THE AMERICAN INSTITUTE OF ARCHITECTS

2016 AIA Fellowship

Entry 133662

Nominee	Charles Besjak
Organization	Skidmore, Owings & Merrill LLP
Location	New York, New York
Chapter	AIA New York

Category of Nomination

Category Two - Practice (Technical Advancement)

Summary Statement

An architect and structural engineer, Charles Besjak practices and promotes a bold and innovative integration of these disciplines, resulting in a body of work—projects, research, and lectures—that has profoundly influenced the profession.

Education

University of Illinois at Urbana-Champaign - Urbana, Illinois. 2 Years. Masters of Architecture, Structural Engineering
University of Illinois at Urbana-Champaign - Urbana, Illinois. 4 Years. Bachelor of Science, Architectural Studies

Licensed in: New York Illinois

Employment

Skidmore, Owings & Merrill LLP, 06/1987-present. 28 Years.

SKIDMORE, OWINGS & MERRILL LLP
14 WALL STREET
NEW YORK, NY 10005

SOM

October 16, 2015
Diane Georgopulos, FAIA
Chair, 2016 AIA Fellowship Jury
421 7th Street NW
Washington, DC 20004

Dear Ms. Georgopoulos:

It is with great enthusiasm that I write to sponsor the candidacy of Charles Besjak AIA, PE, SE for advancement to Fellowship in the American Institute of Architects.

I have known Chuck for over 20 years as a colleague and collaborator on many projects at SOM. As SOM's Director of Structural Engineering, Chuck brings a singular perspective to the design of complex buildings: in addition to being a distinguished structural engineer, he is also a skilled and imaginative architect. This combined creative and empirical design background enables Chuck to be equally skilled in the resolution of project designs from an architectural perspective and in making the structural design integral, efficient and often sublimely elegant. The latter is especially evident in such projects as the United States Air Force Academy Center for Character and Leadership Development and Denver Union Station, in both of which the architecture and engineering are inextricable from one another and from the overall design vision.

Chuck's unique combination of structural engineering insight and creative natural design abilities serves as a cohesive force that fosters an integrated design approach. His portfolio of over 95 structures includes some of the world's tallest buildings including the 1,670-foot-tall Busan Lotte Town Tower in South Korea and the 1,480-foot-tall Zifeng Tower in Nanjing, China. Other notable structures include Chhatrapati Shivaji International Terminal in Mumbai, India; and the King Abdullah Financial District Conference Center in Riyadh, Saudi Arabia. Working collaboratively with multidisciplinary teams, he has developed a wide range of innovative structural systems for laboratories, airports, hospitals, corporate office buildings, government buildings, and residential centers. His integral structural strategies have also been implemented in major projects on Kuwait University Athletic Facilities, King Abdullah Financial District Center, General Motors Renaissance Center Entrance Pavilion, and Changi International Airport Terminal 3.

Many of the buildings in his extensive portfolio have been recognized with awards by both architectural and structural engineering societies. In addition to having served on the organizing committee for IABSE Congress on Creating and Renewing Urban Structures in Chicago and being active in the Council on Tall Buildings and Urban Habitat, Chuck is equally influential locally as an active member of the Structural Engineers Association of New York. He lectures frequently on a wide range of topics in professional and academic settings, including state-of-the-art tall building design, high-rise design in seismic zones, cable-net structures, and unique composite structural systems for high-rise building design.

In my more than 30 years of experience as an architect at SOM working with in-house as well as outside consulting engineers, I have rarely encountered a more collaborative architect/engineer who understands and supports the designers' objectives and furthered their initial visions by making the structural solutions an integral part of their designs. I believe wholeheartedly that Chuck's contributions have greatly enhanced the practice of architecture across the globe. As evidenced by his extensive portfolio and numerous awards from the AIA and the Structural Engineering Associations of New York and Illinois, his leadership in advancing design excellence in the integration of structural design into notable projects – for example Lotte Super Tower in Korea, Pearl River Tower in China, and the US Air Force Academy Center for Character and Leadership Development in Colorado – is remarkable.

Without any hesitation and with great enthusiasm, I urge the jury to elevate Charles Besjak AIA, PE, SE to the College of Fellows in Category Two - Practice (Technical Advancement) and to thus honor him and the profession.

Yours Sincerely,

Mustafa K. Abadan, FAIA
Partner
Chairman, SOM Foundation

1

1.2 SUMMARY OF ACHIEVEMENTS

CHARLES BESJAK, AIA, PE, SE

STATEMENT

An architect and structural engineer, Charles Besjak practices and promotes a bold and innovative integration of these disciplines, resulting in a body of work—projects, research, and lectures—that has profoundly influenced the profession.

SUMMARY OF ACHIEVEMENTS

Integration of Architecture and Structural Engineering

Chuck's dual focus—simultaneously on art and science, efficiency and aesthetics—informs some of the world's most dramatic, precedent-setting structures. In blending architectural and structural engineering design, he has created an aesthetic of unity: each project is the integrated and harmonious realization of the synthesis of efficient structural expression and architectural beauty and function. As Director of Structural Engineering for Skidmore, Owings, & Merrill LLP (SOM), Chuck's close and continual collaboration with architectural design teams is evident in such projects as Zifeng Tower, on its completion the tallest building in China and the fifth tallest in the world; Pearl River, a ground-breaking exemplar of sustainability produced by the integrated performance of architecture and structure; and Lotte Super Tower, with its architecturally expressed diagrid perimeter.

Aesthetics and efficiency are similarly inseparable as seen in Chuck's design for the soaring long-span roof of Chhatrapati Shivaji Airport in Mumbai, where seven acres of roof are supported by only 30 mega-columns. With the canopy that clear-spans 180 feet of railroad track at Denver Union Station's Intermodal Hub, the distinction between architecture and structure is entirely eliminated and the forms created by the trusses are strongly expressed.

Chuck's architectural sensibilities are especially apparent in some of his smaller, jewel-like projects. In the General Motors Entrance Pavilion, engineering excellence was the underlying motive, which Chuck interpreted in a free-standing lens shape of glass and cables. His design for the skylight of the US Air Force Academy's new Center for Character and Leadership Development resulted in a glass and steel structure, with the unadorned aerodynamics of an aircraft.

Innovations

Chuck's innovations focus on advancing the form of architecture to achieve the efficiency of the structure. The design for Pertamina Energy Tower in Jakarta aims to make it the first net-zero energy super-tall in the world. Coupled with Pearl River Tower in Guangzhou and Digital Media Center in Seoul, these projects have yielded new and replicable approaches to sustainability. Chuck has developed new structural systems, notably the diagrid, which is capable of reducing as much as 25 percent of the amount of structural steel used in a conventional perimeter-framed tower. He holds a patent for a precast concrete core system that increases the efficiency, safety, and constructability of tall buildings.

Recognized globally for his expertise in the increasingly complex process of integrating architectural and structural engineering design, Chuck has contributed significantly to such efforts as a definitive guide to the use of outriggers in tall buildings, put out by the Council on Tall Buildings and Urban Habitat, of which he has been a member since 2008. He developed a pioneering method for evaluating performance-based seismic design, a vitally important contribution to the design of tall buildings which typically cannot be described by existing prescriptive international building codes.

Influence

Chuck is deeply committed to advancing the cause of integrated architectural and structural engineering design and devotes enormous time and energy to promulgating his principles and practices. He has published more than 35 peer-reviewed learned papers on such topics as challenges in high-rise building design, composite structural systems for high-rise buildings in seismic zones, and integrated design for sustainability. He regularly gives speeches and lectures throughout the US and overseas for practicing architects and graduate students in architecture, to advance their understanding of the relationship of architecture and structural engineering in super-tall buildings, and to structural engineers, to advance the integration of the disciplines and encourage the collaboration of the professions.

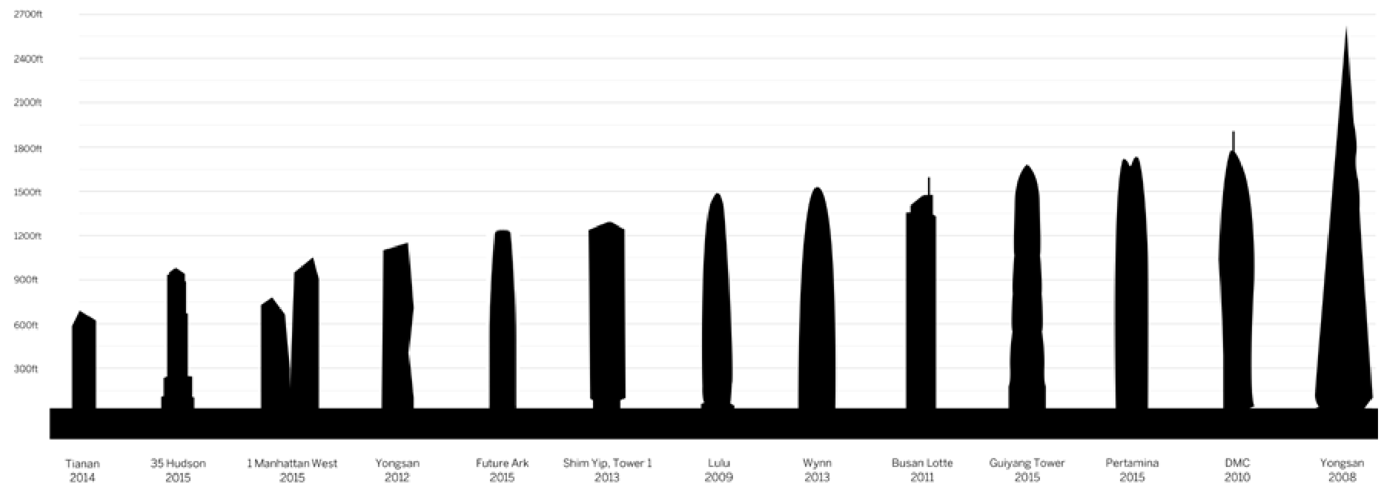
The effects of Chuck's work are evident not only in the numerous awards for and widespread media coverage of his work, but in the dissemination of his contributions throughout the architectural profession and his profound and lasting contributions to its advancement.

2

2.0 ACCOMPLISHMENTS

SIGNIFICANT WORK

Chuck's influence on the design and performance of super-tall buildings is both global and profound. His projects set standards for the symbiosis of architecture and structural engineering that results in buildings of singular elegance. Such innovations as the diagrid system and the means of determining its ductility factor [R-value] in high seismic areas, the definition of sustainability in super-tall buildings, and numerous examples of the expression of structural engineering in architectural design have made his projects models for study and emulation throughout the profession.



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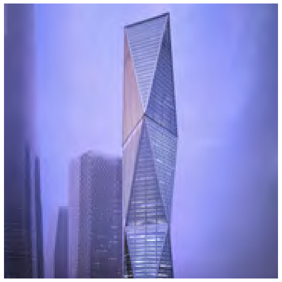
2.1 ACCOMPLISHMENTS

NOTEWORTHY PROJECTS



Design Competiton: 2013
Seoul, South Korea
Lead Structural Engineer

Diagonal Tower

A case study in efficiency, the design of this 1,125-foot-tall tower—a close collaboration of structural engineer and architect — integrates massing, structure, and performance to minimize wind loads, reduce construction costs, and meet Seoul's stringent sustainable design guidelines. The diagrid increases structural efficiency and makes possible the 45-degree rotation of the floor plates at one-third and two-thirds the building's height which, in turn, allows views to nearby landmarks. The faceted form and the distribution of loads to the building exterior both work to mitigate wind loads.

Anticipated Completion: 2017
New York, New York
Lead Structural Engineer

Manhattan West North Tower

The Manhattan West project is sited on land currently open to railroad tracks west of New York City's Penn Station. The Northeast Office Tower, 1,045 feet tall, is framed in structural steel with reinforced concrete core walls. To avoid the tracks below and allow for a column free lobby space, the perimeter steel columns are kicked back to the concrete core between the lower mechanical floor and the foundations.

Anticipated Completion: 2016
Shenzhen, China
Lead Structural Engineer

Shenzhen Rural Commercial Bank Headquarters

The 500-foot mixed-use tower establishes an international benchmark for sustainable design through the integration of structural engineering and architecture. Naturally ventilated vertical atria stretching the full height of the tower's east and west façades create air circulation; the atria also provide spectacular views from every floor. The external steel diagrid structure is pulled away from the façade, enabling flexible, column-free interior spaces and providing solar shading.

Anticipated Completion: 2021
Jakarta, Indonesia
Lead Structural Engineer

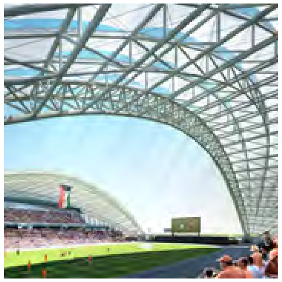
Pertamina Energy Tower

Planned to be the world's first net-zero energy skyscraper, Pertamina Energy Tower is aiming for LEED Platinum. Given the relatively high seismic forces at the site, the 1,740 foot-tall tower uses a dual structural system to resist lateral loads; the system consists of a ductile reinforced concrete core coupled to a perimeter moment frame with an outrigger and belt truss system at the mechanical levels. The continuously tapering geometry and large notches of the tower's form reduce vortex shedding and minimize wind-induced acceleration and forces.

2

2.1 ACCOMPLISHMENTS

NOTEWORTHY PROJECTS



Anticipated Completion: 2017
Shadadiya, Kuwait
Lead Structural Engineer

Kuwait University Stadium & Tennis Center

Given the harsh desert climate, the roofs for the Grand Stadium and the Tennis Center—key components of the new athletic facilities for Kuwait University—are significant functional, as well as aesthetic, elements. The geometry of the thin shell concrete covering the indoor Tennis Center is a catenary dome, a traditional architectural element in the Middle East and one that optimizes the use of material. The two roofs of the Grand Stadium, also catenary in geometry, take design inspiration from the arching trajectories of track and field sports.

Anticipated Completion: 2016
Busan, South Korea
Lead Structural Engineer

Busan Lotte

The design of the 1,675-foot-plus super tower resolved a number of major challenges—complex multi-use program, dense site, and typhoon winds—as well as objectives such as maximizing efficiency and views and limiting the perception of motion. The solution is a triangular shape and distinctive stacked massing, with setbacks at the transitions between major program elements and arranged with a clock-wise spin to animate the façades. Concrete outrigger walls transfer perimeter column loads to six mega-columns, enabling independent column layouts to suit differing functions.

Date of Completion: 2009
Buffalo, New York
Lead Structural Engineer

Darwin D. Martin House Visitor Center

An integral element in architect Toshiko Mori's award-winning design, the structure of the visitor's center is inspired by that of Frank Lloyd Wright's Martin House. Four columns frame a large skylight that acts as a light source for the lower level, as well as a stack ventilator. Rather than shedding the heavy snowfall typical in the region, the sloped roof, shaped like an inverted hip, is designed to hold snow in winter as a natural insulating layer. Tiny custom stainless steel perimeter columns also serve as mullions between the large glass panels, to maximize the building's overall transparency.

Anticipated Completion: 2017
Shenzhen, China
Lead Structural Engineer

Shum Yip Tower One

To accommodate the floor-plans required by office spaces on the lower floors and luxury hotel above, the 1,250-foot tower uses an innovative "ladder truss" structural system. The system incorporates a ductile reinforced concrete core with in-line concrete-encased structural mega-columns at the perimeter, linked at each floor with a deeper ductile link beam. The resulting tower has just eight columns and is the first of its kind in China.

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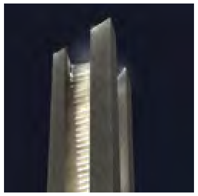
2.1 ACCOMPLISHMENTS

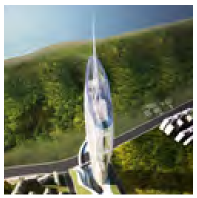
SELECTED PROJECTS



ARB Headquarters
Riyadh, Kingdom of Saudi Arabia
Anticipated Completion: Ongoing
Role: Lead Structural Engineer

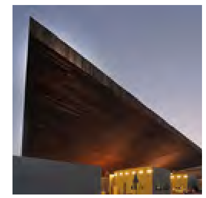
All Aboard Florida
Miami, Florida
Anticipated Completion: 2016
Role: Lead Structural Engineer

Lulu Tower
Abu Dhabi, United Arab Emirates
2012 Competition
Role: Lead Structural Engineer



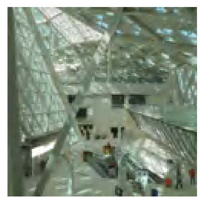
Seoul Light Digital Media Center
Seoul, South Korea
Anticipated Completion: N/A
Role: Lead Structural Engineer

Longgang Tian'an Cyber Park
Longgang, Shenzhen, China
Anticipated Completion: 2016
Role: Lead Structural Engineer



Kuwait Police College
Kuwait City, Kuwait
Completed: 2011
Role: Lead Structural Engineer

Changsha North Star Tower
Changsha, China
Anticipated Completion: 2020
Role: Lead Structural Engineer



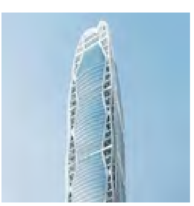
King Abdullah Financial District Conference Center (KAFD)
Riyadh, Saudi Arabia
Completed: 2015
Role: Lead Structural Engineer

Park Hotel
Hyderabad, India
Completed: 2010
Role: Lead Structural Engineer

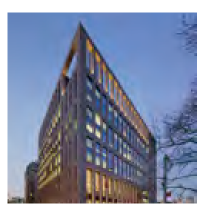
Guiyang World Trade Center
Guiyang, China
Anticipated Completion: 2020
Role: Lead Structural Engineer

KAFD - Muqarnas Tower
Riyadh, Saudi Arabia
Completed: 2015
Role: Lead Structural Engineer

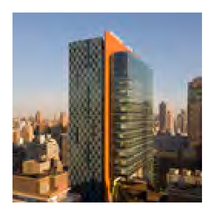
Yongsan Tower
Seoul, South Korea
2009 Competition
Role: Lead Structural Engineer



Guiyang Cultural Plaza Tower
Guiyang, China
Anticipated Completion: 2018
Role: Lead Structural Engineer



Mount Sinai Center for Science and Medicine
New York, New York
Completed: 2013
Role: Lead Structural Engineer



Memorial Sloan Kettering Cancer Center
New York, New York
Completed: 2008
Role: Lead Structural Engineer

2

2.1 ACCOMPLISHMENTS

SELECTED PROJECTS

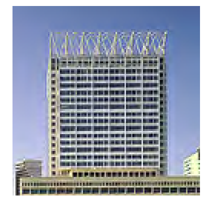
Changi International Airport, Terminal 3
Changi, Singpore
Completed: 2007
Role: Lead Structural Engineer

Rockwell Center, Phase 1
Manila, Philippines
Completed: 1999
Role: Project Engineer

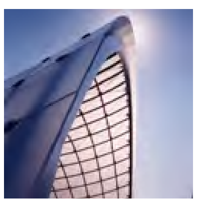
Sioux City Art Center
Sioux City, Iowa
Completed: 1996
Role: Project Engineer

Chemsunny Plaza
Beijing, China
Completed: 2006
Role: Lead Structural Engineer

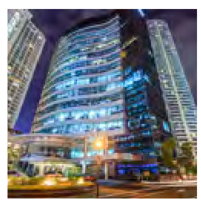
Lopez Tower
Manila, Philippines
Completed: 1999
Role: Project Engineer



100 East Pratt
Baltimore, Maryland
Completed: 1992
Role: Project Engineer

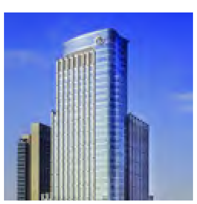


Raspberry Island Bandshell
St. Paul, Minnesota
Completed: 2002
Role: Lead Structural Engineer

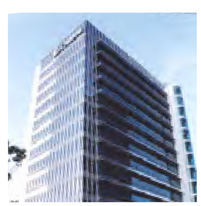


Phinma Plaza
Manila, Philippines
Completed: 1998
Role: Project Engineer

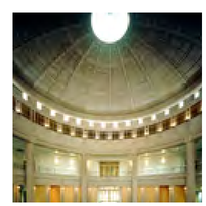
Vila Olimpica
Barcelona, Spain
Completed: 1992
Role: Project Engineer



Bank Boston Headquarters
Sao Paulo, Brazil
Completed: 2002
Role: Lead Structural Engineer



Nestle Makati
Manila, Philippines
Completed: 1998
Role: Project Engineer



Aurora Municipal Justice Center
Aurora, Colorado
Completed: 1990
Role: Project Engineer

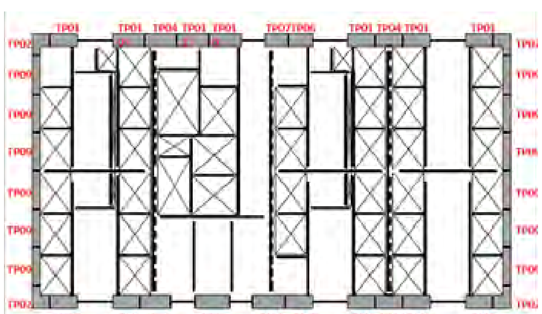
2 2.1 ACCOMPLISHMENTS
INNOVATIONS

US Patent: Pre-Cast Core Walls

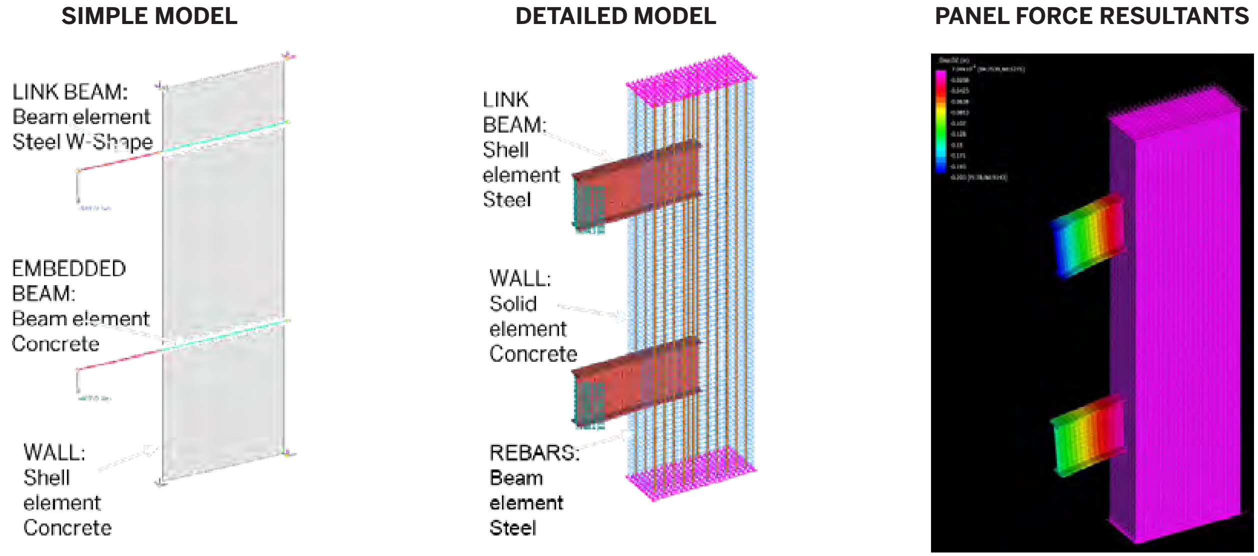
In 2011, Chuck received a US patent for his precast concrete core system of precise wall panels and a method for constructing high-rise buildings with those panels. While the system and methodology increase efficiency, safety, and constructability, they also resolve issues that arise, in particular in New York City, between concrete and steel contractors. Chuck's approach enables the latter to place the precast units, cutting as much as eight months from the construction schedule and reducing the overall cost. Chuck's presentations to architects have met with great enthusiasm.

All images contributed by SOM Studio

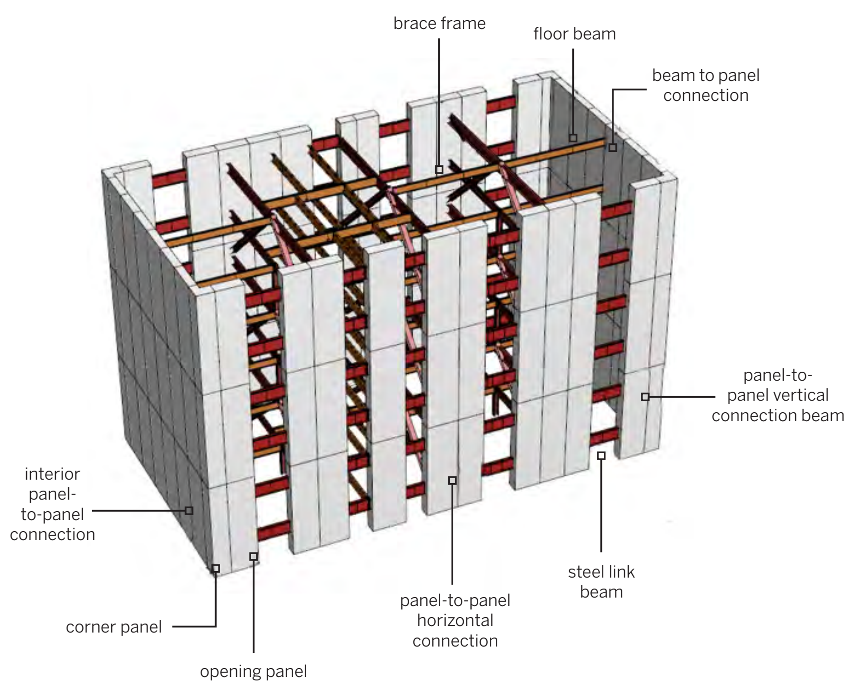

United States Patent
Carrion et al.
Patent No.: US 8,074,414 B2
Date of Patent: Dec. 13, 2011



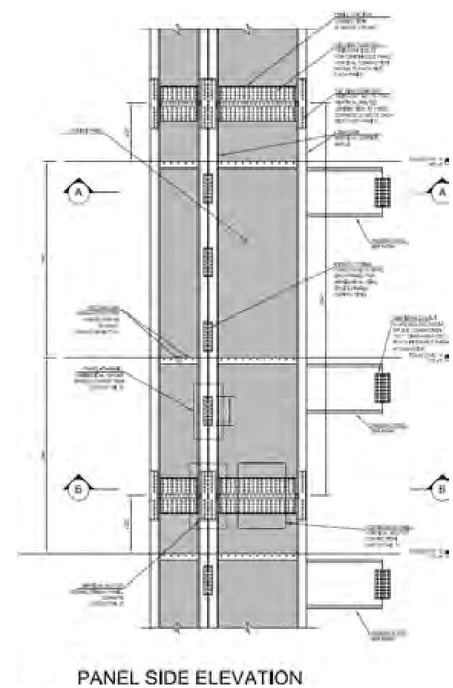
Precast core wall panel module.



Detailed structural analysis models of typical 2-story precast panel.



Precast core wall component assemblage.



Detailed drawing of precast connections.

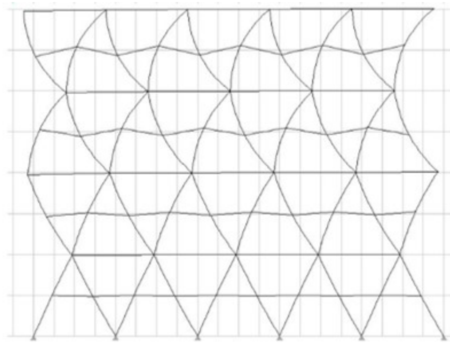
2 2.1 ACCOMPLISHMENTS
INNOVATIONS

Diagrid System

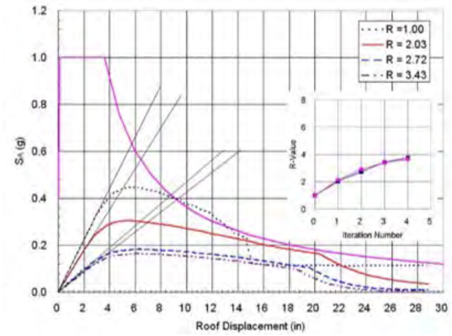
When Chuck pioneered the diagrid system for super-tall buildings, existing codes did not define a relevant R-value [ductility factor]. Using Lotte World, the 1,800-foot-tall diagrid tower, as a prototype, Chuck developed a prescriptive methodology for determining the R-value, establishing the precedent used in international code.

All images contributed by SOM Studio

Architectural model of Lotte Super Tower.

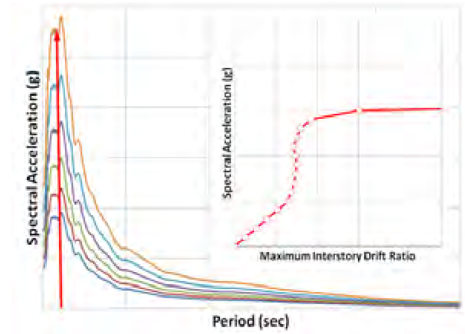


The 8-story archetype model used to estimate the seismic performance factor of steel diagrid frame system.

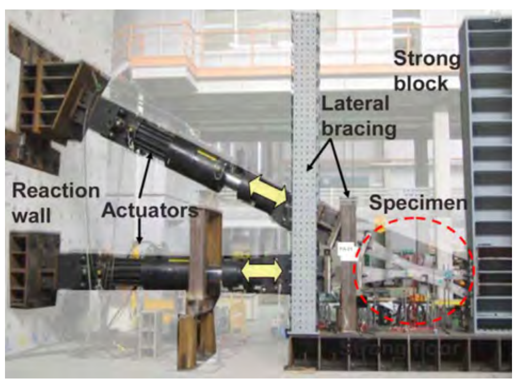


Nonlinear static analysis (Pushover analysis) with PERFORM-3D utilized. The diagrid column section modeled with a "Column, Inelastic Fiber Section".

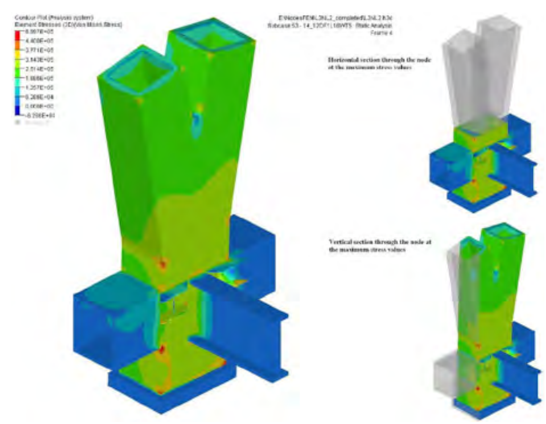
R-value reaches to R = 4.0



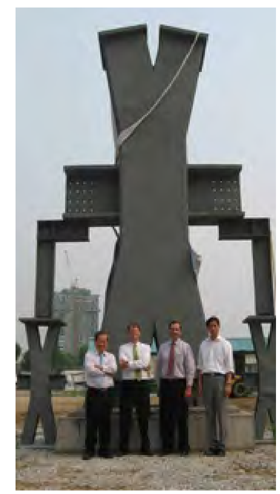
Incremental dynamic analysis and corresponding maximum drift ratios.



Load test of typical diagrid.



Analytical node stress.



Full scale mock-up of typical node.

2.1 ACCOMPLISHMENTS

SERVICE TO THE PROFESSION

SELECTED AFFILIATIONS

Member, American Institute of Architects, 1995 - present

Member, American Institute of Architects - New York Chapter, 2008 - present

Contributor and Reviewer for NYC's Risk Landscape: A Guide to Hazard Mitigation

Member, American Concrete Institute, 2013 - present

Member, American Society of Civil Engineers, 2001 - present

Member, Council on Tall Buildings and Urban Habitat, 2008 - present

Outrigger Review Committee

Foundation Review Committee

Member, Earthquake Engineering Research Institute, 2008 - present

Member, International Association of Bridge and Structural Engineers, 2006 - present

Organizing Committee for Congress of Creating and Renewing Urban Structures Chicago

Member, Structural Engineers Association of New York, 2008 - present

Member, Structural Engineers Association of Illinois, 1998 - present

SELECTED ACADEMIC CONTRIBUTIONS

2012 *Structural Design for Tall Buildings*
Tall Building Studio Design Course, Rhode Island School of Design - Providence, Rhode Island

"New Trends in Seismic Evaluation and Retrofit"
Polytechnic Institute of NYU - Brooklyn, New York

2011 *"New York Structures - High Rise and Long Span"*
Parsons School of Design, The New School - New York, New York

Tall Building Seminar
Yale University - New Haven, Connecticut

Super-Tall Buildings & Long Mega Structures
Universidad Autónoma de Nuevo Léon - Monterrey, Mexico

2010 *"Super Tall Towers"*
University of Pennsylvania - Philadelphia, Pennsylvania

2009 *"Integrating Structure into Super-Tall Towers"*
Yale University School of Architecture - New Haven, Connecticut

2008 *"Lotte Tower"*
Massachusetts Institute of Technology - Cambridge, Massachusetts

2005 *"The Integration of Architecture with Other Disciplines"*
University of Illinois - Chicago, Illinois

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2.1 ACCOMPLISHMENTS

SERVICE TO THE PROFESSION

SELECTED SPEECHES

2015 *“Mediating Scale, Performance, and Inconicity: A 21st Century Supertall Tower for Guiyang”*
Council on Tall Buildings and Urban Habitat Conference - New York, New York

“Chhatrapati Shivaji International Airport - Terminal 2”
Architectural Engineering Institute Conference - Milwaukee, Wisconsin

2014 *“Pearl River Tower: Design Integration Towards Sustainability”*
2014 Structures Congress Technical Sessions, American Society of Civil Engineers - Boston, Massachusetts

“Earthquakes - How Well Are We Prepared?”
AIA New York Center for Architecture - New York, New York

“SOM Design Evolution: Technology’s Role in Crafting Architecture”
The Value of Design 2014 - Delft, Netherlands

2011 *“Busan Lotte Tower”*
Council on Tall Buildings and Urban Habitat Conference - Seoul, South Korea

2010 *“High Rise Building Innovations in Design and Construction”*
The Institution of Engineers India - Mumbai, India

2008 *“555m Tall Lotte Super Tower: The Second Tallest Building in the World”*
ASCE Structures Group Spring Seminar - New York, New York

2006 *“Structural Efficiency of Lotte Super Tower”*
Seoul, South Korea

2005 *“Analysis and Design of the Memorial Sloan-Kettering Research Laboratory Building”*
2005 Structures Congress Technical Sessions, American Society of Civil Engineers - New York, New York

2000 *“Designing Thin Structures for Gehry and SOM: The Guggenheim Museum”*
Think Skin Workshop - Salzburg, Austria

2 2.2 ACCOMPLISHMENTS

AWARDS

American Institute of Architects (AIA), International Chapter Award of Merit, 2015
Park Hotel: Hyderbad, India

AIA, Institute Honor Awards for Regional & Urban Design, 2014
Denver Union Station

AIA, New York State Award of Merit, 2013
Diagonal Tower

AIA Committee on Architecture for Education, Award of Merit, 2012
US Air Force Academy Center for Character and Leadership Development

AIA - New York City Chapter, Honor Award, 2012
US Air Force Academy Center for Character and Leadership Development

AIA, Boston Society of Architects Unbuilt Architecture and Design Award, 2011
ARB Headquarters: Riyadh, Saudi Arabia

AIA, Boston Society of Architects Unbuilt Architecture and Design Award, 2010
Qatar Petroleum Center

AIA, New York City Chapter Merit Award, 2008
ARB Headquarters: Riyadh, Saudi Arabia

AIA, New York State Award of Merit, 2007
Memorial Sloan Kettering Cancer Center

AIA - Washington DC Chapter, Award of Excellence in Architecture, 2007
Memorial Sloan Kettering Cancer Center

AIA - New York City Chapter, Design Award: Project, 2003
Changi International Airport, Terminal 3

AIA - St. Louis Chapter, Honor Award for Architecture, 1997
Washington University Psychology Building

AIA, California Council Award, 1993
100 East Pratt Street

AIA - Washington DC Chapter, Merit Award for Architecture, 1992
100 East Pratt Street

AIA, American Correctional Association Citation of Excellence, 1988
100 East Pratt Street

Chicago Athenaeum International Architecture Award, 2014
Mount Sinai Center for Science and Medicine

Chicago Athenaeum, International Architecture Award, 2012
US Air Force Academy Center for Character and Leadership Development

Chicago Athenaeum, Green Good Design Award, 2011
US Air Force Academy Center for Character and Leadership Development

Chicago Athenaeum, Green Good Design Award, 2011
Pearl River Tower

Chicago Athenaeum, American Architecture Award, 2004
Changi International Airport, Terminal 3

Chicago Athenaeum, American Architecture Award, 2001
Changi International Airport, Terminal 3

National Council of Structural Engineers Association (NCSEA), International Structures Over $100M, Outstanding Project, 2015
Chhatrapati Shivaji International Airport, Terminal 2

NCSEA - Northern California, Award of Excellence: Sustainable Design Category, 2015
Pearl River Tower

NCSEA, Excellence in Structural Engineering, 2014
Chhatrapati Shivaji International Airport, Terminal 2

NCSEA, Excellence in Structural Engineering, 2014
Denver Union Station

NCSEA - New York, Excellence in Structural Engineering Award, 2013
Denver Union Station

Structural Engineers Association of Illinois, Best International Project Over $150 Million, 2012
Zifeng Tower

NCSEA - Illinois, Excellence in Structural Engineering: Best Medium Structural Project, 2009
Darwin D. Martin House Visitor Center

2

2.2 ACCOMPLISHMENTS

AWARDS

NCSEA, Excellence in Structural Engineering Award of Merit, 2006
General Motors Renaissance Center

NCSEA - Illinois, Excellence in Structural Engineering Award of Merit, 2006
Memorial Sloan Kettering Cancer Center

NCSEA, Excellence in Structural Engineering: Award of Merit, 2004
Raspberry Island Bandshell

NCSEA - Illinois, Excellence in Structural Engineering Most Innovative Structure, 1992
Washington University Psychology Building

2015

Architectural Engineering Institute (AEI), Award of Excellence for Architectural Engineering Integration
Chhatrapati Shivaji International Airport, Terminal 2

AEI, Award of Merit for Structural Systems Design
Chhatrapati Shivaji International Airport, Terminal 2

American Institute of Steel Construction (AISC), National Award for Excellence in Steel-Frame Building Design (Less Than $15M)
Denver Union Station

Architizer, A+ Award Jury Winner: Transportation – Airports
Chhatrapati Shivaji International Airport, Terminal 2

Building and Structural Design, A'Design Award & Competition, Platinum Award for Architecture
Chhatrapati Shivaji International Airport, Terminal 2

2014

AEI Affiliated Engineers, Most Innovative Project: Mechanical Systems Design
Pearl River Tower

Architizer, A+ Award: Office Building High Rise - Finalist
Pearl River Tower

Design-Build Institute of America (DBIA), Project of the Year Award
Denver Union Station

DBIA, National Award of Merit
Denver Union Station

Engineering News Record (ENR) Best Project (Western Region) in Airport/ Transit Category
Denver Union Station

International Property Awards Commercial Highrise China Award
Pearl River Tower

2013

ASHRAE - Illinois Chapter, Excellence in Engineering
Pearl River Tower

Council on Tall Buildings and Urban Habitat (CTBUH), Best Tall Building Asia & Australia: Finalist
Pearl River Tower

MIPIM Asia, Best Innovative Green Building
Pearl River Tower

Spark Awards, Spark Transport: Gold
Denver Union Station

2010

Eco-Structure Evergreen Award
Seoul Light Digital Media City Tower

2008

Spark Awards, Green, Carbon-Lowering & Environmental Category: Gold
Pearl River Tower

Urban Land Institute, Award for Excellence: The Americas
General Motors Renaissance Center

2006

Greater New York Construction User Council Chairman's Award: Most Outstanding Healthcare Project
Memorial Sloan Kettering Cancer Center

MIPIM / Architectural Review Future Project Award: Commended Tall
ARB Headquarters: Riyadh, Saudi Arabia

New York Construction Project of the Year: Award of Merit
Memorial Sloan Kettering Cancer Center

2005

American Council of Engineering Companies of Michigan, Engineering and Surveying Excellence Award
General Motors Renaissance Center

Cityscape / Architectural Review, Award: Shortlisted
Changi International Airport, Terminal 3

2004

AISC, Engineering Award of Excellence
Raspberry Island Bandshell

Architect Magazine, Progressive Architecture (P/A) Award
Changi International Airport, Terminal 3

1992

ASHRAE Illinois Chapter Excellence in Engineering
Washington University Psychology Building

MEDIA

SELECTED LEARNED PAPERS & ARTICLES BY CHARLES BESJAK

“**Converting Air Rights Challenges into Significant Opportunities in NYC Manhattan West and Hudson Yards**”, Besjak, Charles, Bonghwan Kim, Aurelie Ble, Alexandra Thewis, *ASCE International Structures Congress, Portland, OR, April 2015.*

“**New Heights in Sustainability – Pertamina Energy Tower**”, Besjak, Charles, Preetam Biswas, Georgi Petrov, Gavin Meinschein, Alexander Jordan, *ASCE International Structures Congress, Portland, OR, April 2015.*

“**510 Meter Super-tall Busan Lotte Town Tower: Engineering the Architecture to Minimize Extreme Winds,**” Besjak, Charles, Bonghwan Kim, Dohan Kong, *ASCE International Structures Congress, Boston, MA, April 2014.*

“**Shenzhen Shum-Yip Tower One – Gravity and Lateral Load Resisting System Optimization**”, Besjak, Charles, Preetam Biswas, Syed Uzair Ullah, Xiaoyu He, Jing Zhuang, *ASCE International Structures Congress, Boston, MA, April 2014.*

“**Pearl River Tower: Design Integration towards Sustainability**”, Besjak, Charles, William Baker, Brian McElhatten, Xuemei Li, *ASCE International Structures Congress, Boston, MA, April 2014.*

“**Geometric Optimization of Kuwait University Stadium and Tennis Centre**”, Besjak, Charles, Preetam Biswas, and Georgi Petrov, *ASCE International Structures Congress, Pittsburgh, PA, April 2013.*

“**Center for Character and Leadership Development at the United States Air Force Academy**”, Besjak, Charles, Preetam Biswas, and Raymond Sweeney, *OSCE International Structures Congress, Pittsburg, PA, April 2013.*

“**King Abdullah Financial District Conference Center**”, Besjak, Charles, Preetam Biswas, Georgi Petrov, and Blake Altshuler, *ASCE International Structures Congress, Pittsburgh, PA, April 2013.*

“**Chhatrapati Shivaji International Airport–Integrated Terminal Building,**” Besjak, Charles, Preetam Biswas, Alexandra Thewis, Damayanti Chaudhuri, *Structural Engineering International, the Journal for the International Association for Bridge and Structural Engineering, February 2013.*

“**Proposed Methodology to Determine Seismic Performance Factors for Steel Diagrid Framed Systems**”, Besjak, Charles, William Baker, Mark Sarkisian, Peter Lee, and Chung-So Doo, *13th U.S.-Japan Workshop on the Improvement of Structural design and Construction Practices, 2010.*

“**Performance-Based Evaluation for the 450m Nanjing Greenland Financial Center Main Tower**”, Besjak, Charles, Brian McElhatten, Preetam Biswas, *CTBUH Journal, 2009 Issue II.*

“**555m Tall Lotte Super Tower, Seoul, Korea**”, Besjak, Charles, Bonghwan Kim, Preetam Biswas, *ASCE International Structures Congress, Austin, Texas, April 2009.*

“**Analysis and Design of the Memorial Sloan-Kettering Research Laboratory Building**”, Besjak, Charles, Shane McCormick, Dmitri Jajich, *ASCE International Structures Congress, New York, New York April 2005.*

“**Structuring Glass Spaces with Non-Linear Elements: Current SOM Projects,**” Besjak, Charles, William F. Baker, Shane McCormick, *Proceedings: Structures 2002 Congress and Exposition, Denver, Colorado, April 2002.*

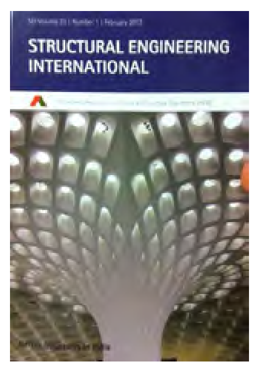
“**The State-of-the-Art of Tall Steel Building Design**”, Besjak, Charles, William F. Baker, *International Seminar on the Use of Steel Structures in Civil Construction, International Conference on Steel Construction - CICOM, Sao Paulo, Brazil, November 2001.*

“**Glass cable-net entrance pavilion for GM Global Headquarters**”, Besjak, Charles, William Baker, *Proceedings: Glass in Buildings, Bath, UK April 1999.*

“**Unique Composite Structural Systems for High-Rise Building Design in Seismic Zones: Lopez Tower Manila, Philippines**”, Besjak, Charles, John Zils, *Proceedings: The Fifth International Conference on Tall Buildings, Hong Kong, December 1998.*

“**Cable-Net Entrance Pavilion for GM Global Headquarters**”, Besjak, Charles, William F. Baker, *Proceedings: Lightweight Structures in Architecture, Engineering and Construction, Sydney, Australia, October 1998.*

“**Challenges for High-Rise Building Design: A Case Study of Rockwell Center, Manila, The Philippines**”, Besjak, Charles, John Zils, *Proceedings: Fourth Council on Tall Buildings in Seismic Regions, Los Angeles, California, May 1997.*



2

2.3 ACCOMPLISHMENTS

MEDIA

SELECTED MEDIA COVERAGE OF PROJECTS

2015

designboom, *"A' design awards 2014-2015 winners announced"* on Chhatrapati Shivaji International Airport Terminal 2

BD+C, *"Best in steel construction: 12 projects earn structural steel industry's top building award"* feature on Denver Union Station

The New York Times, *"Refurbished Stations From Denver to Tokyo"* feature on Denver Union Station

ArchDaily, *"Building of the Year 2015"* feature on Chhatrapati Shivaji International Airport Terminal 2

BBC, *"The world's most spectacular new airports"* on Chhatrapati Shivaji International Airport Terminal 2

The Economist, *"Invisible Fuel"* on Pertamina Energy Tower

2014

CNN Travel, *"Five signs America is falling in love with public transit"* online feature on Denver Union Station

RIBA, *"Tall Order"* feature on Pertamina Energy Tower & Pearl River Tower

Mass Transit, *"Denver Union Station Bus Concourse Awarded Prestigious LEED Green Building Certification",* feature on Denver Union Station

Miami Herald, *"Massive Miami Central train station would be a new urban hub downtown",* article on All Aboard Florida

The Nation, *"PT Pertamina's net-zero energy skyscraper in Jakarta a world first"* feature on Pertamina Energy Tower

Architecture Update Magazine, *"An Infrastructure Renaissance"* article on Chhatrapati Shivaji International Airport Terminal 2

AIA, *"AIA Selects Eight Projects for National Heathcare Design Awards"* featuring Mount Sinai Center for Science and Medicine

Forbes, *"India's Time for Growth",* on Chhatrapati Shivaji International Airport Terminal 2

Sun Sentinel, *"Rail station will transform city center"* on All Aboard Florida

The Wall Street Journal, *"Now Arriving: A Passenger-Train Revival?"* on All Aboard Florida

e-Oculus, *"In The News: All Aboard Florida"* article on All Aboard Florida

Civil Engineering, *"Transportation: Proposed Florida Rail Line Unveils Design for Miami Station"* on All Aboard Florida

Denver Post, *"For Denver's Union Station, a new role as unifier"* on Denver Union Station

World Architecture News, *"All Aboard Florida Miami Station Revealed"* on All Aboard Florida

Fast Company, *"Express Rail Comes to Florida and Miraculously The Stations Don't Look Like Crap",* article on All Aboard Florida

ArchDaily, *"SOM Reveals Design for "All Aboard Florida" Train Station"* feature on All Aboard Florida

Civil Engineering, *"Supertall Jakarta Tower Driven by Sustainability"* on Pertamina Energy Tower

ArchDaily, *"Denver Union Station/SOM"* feature on Denver Union Station

Civil Engineering, *"Denver Designs an Intermodal Powerhouse"* on Denver Union Station

Denver Business Journal, *"More on the cover story: A long road led to Denver Union Station's rebirth"* on Denver Union Station

Sustainablebusiness.com, *"Indonesia Gets World's First Net-Zero Energy Skyscraper"* feature on Pertamina Energy Tower

Architectural Record, *"Denver Union Station is a "Game Changer"* feature on Denver Union Station

Real Estate Weekly, *"Construction starts at Hudson Yards platform"* article on Hudson Yards

Railway Track & Structures, *"Amtrak Returns to Denver Union Station",* article on Denver Union Station

Dezeen, *"Special Feature: Ten Amazing Airport Designs"* feature on Chhatrapati Shivaji International Airport Terminal 2

Architectural Record, *"Airport Terminal is a Trove of Art"* feature on Chhatrapati Shivaji International Airport Terminal 2

ArchDaily, *"Chhatrapati Shivaji International Aiport, Terminal 2"* feature on Chhatrapati Shivaji International Aiport, Terminal 2

CNN India, *"Chhatrapati Shivaji"* broadcast on Chhatrapati Shivaji International Aiport, Terminal 2

Airports International, *"Mumbai T2 Inauguration"* on Chhatrapati Shivaji International Airport Terminal 2

The New York Times (India Ink), *"Mumbai's International Airport Gets a Modern Makeover"* on Chhatrapati Shivaji International Airport Terminal 2

Diagrid Structures: Systems, Connections, Details book featuring Lotte Super Tower

2013

The Real Deal, *"Medieval Meets Modern: Manhattan West, SOM's newest office behemoth, recalls famed Two Towers of Bologna"* feature on Manhattan West

American Society of Civil Engineers, *"Diagonal Tower, Yongsan International Business District "* feature on Diagonal Tower

Engineering News Record, *"Diagonal Tower, Yongsan International Business District"* feature on Diagonal Tower

MEDIA

Engineering News Record, *"Denver Union Station Begins New Life as a Regional Hub"* feature on Denver Union Station

Architect's Newspaper, *"Manhattan West"* feature on Manhattan West

Structural Engineering International, *"Chhatrapati Shivaji International Aiport"* feature on Chhatrapati Shivaji International Airport Terminal 2

ArchDaily, *"Manhattan West Breaks Ground"* on Manhattan West

Engineering News Record, *"Diagonal Tower, Yongsan International Business District"* feature on Diagonal Tower

Engineering News Record, *"Denver Union Station Begins New Life as a Regional Hub"* feature on Denver Union Station

Architect's Newspaper, *"Manhattan West"* feature on Manhattan West

Structural Engineering International, *"Chhatrapati Shivaji International Aiport"* feature on Chhatrapati Shivaji International Airport Terminal 2

ArchDaily, *"Manhattan West Breaks Ground"* on Manhattan West

2012

e-Oculus, *"Mount Sinai Center for Science and Medicine opening"* feature on Mount Sinai Center for Science and Medicine

Architect's Newspaper, *"Unveiled: US Air Force Academy "* feature on US Air Force Academy Center for Character and Leadership Development

Architekten24, *"Changi"* feature on Changi International Airport, Terminal 3

ArchDaily, *"CCLD Groundbreaking"* feature on US Air Force Academy Center for Character and Leadership Development

Architizer, *"CCLD Groundbreaking"* on US Air Force Academy Center for Character and Leadership Development

Archello, *"US Air Force Academy Center for Character and Leadership Development"* on Denver Union Station

e-Architect, *"CCLD Groundbreaking"* feature on US Air Force Academy Center for Character and Leadership Development

e-Oculus, *"CCLD Groundbreaking"* feature on US Air Force Academy Center for Character and Leadership Development

MIPIM, *"Best Futura Project"* on Diagonal Tower

Middle East Architect, *"KAFD Conference Center"* feature on KAFD Conference Center

AIArchitect, *"State of Architecture in Busan"* feature on Busan Lotte Town Tower - Haeundae Beach Resort

ArchDaily, *"Busan Lotte Town Tower",* feature on Busan Lotte Town Tower

Surface, *"Transport: The Future in Motion"* feature on Denver Union Station

Airport Architecture, book featuring Changi Airport, Terminal 3 & Chattrapati Shivaji International Airport Terminal 2

Design New England, *"2011 BSA Design Award Winners"* on Al Rajhi Bank Headquarters

2011

D'a Lighting, *"Natural Lighting"* feature on Changi International Airport, Terminal 3

Architect Magazine, *"Diagrid"* feature on Lotte Super Tower

Discovery Channel's "Extreme Engineering", *"Building Mumbai's Modern Airport"* episode on Chattrapati Shivaji International Airport Terminal 2

The Real Deal, *"Mount Sinai - Remade"* on Mount Sinai MSKCC

Fast Company, *"Environmentally-friendly skyscrapers"* on Seoul Light DMC Tower

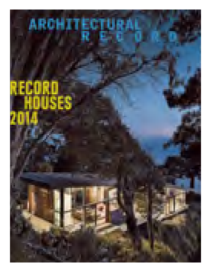
Architect's Newspaper, *"Nation Building"* feature on Seoul Light DMC Tower & Busan Lotte Tower

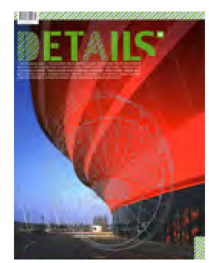
Qanbar Dywidag, *"Architectural Sign for Media City"* on Seoul Light DMC Tower

2010

Tall Buildings (Russia), *"The Beacon of Seoul"* on Seoul Light DMC Tower

The Wall Street Journal, *"The Assessor - A Cure for Cancer Center"* feature on Memorial Sloan Kettering





3

3.1 EXHIBITS

EXHIBIT LIST

Lotte Super Tower

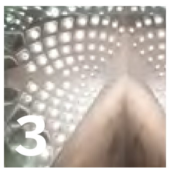
Seoul, South Korea

Photo Credits: Skidmore, Owings & Merrill LLP

United States Air Force Academy Center for Character and Leadership Development

Colorado Springs, Colorado

Photo Credits: Skidmore, Owings & Merrill LLP



Chhatrapati Shivaji International Airport, Terminal 2

Mumbai, India

Photo Credits: Robert Polidori, Skidmore, Owings & Merrill LLP

Denver Union Station

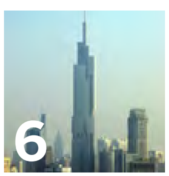
Denver, Colorado

Photo Credits: Ryan Dravitz, Robert Polidori

Pearl River Tower

Guangzhou, Guangdong, China

Photo Credits: Tim Griffith, Si-Ye Zhang



Zifeng Tower

Nanjing, Jiangsu, China

Photo Credits: HanjoH, Li Qihua, Skidmore, Owings & Merrill LLP

General Motors Renaissance Center

Detroit, Michigan

Photo Credits: Justin Maconochie, Skidmore, Owings & Merrill LLP

3.1 Lotte Group
LOTTE SUPER TOWER
Seoul, South Korea

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

N/A

AREA

3,895,880 sf

SELECT RECOGNITION

Diagrid Structures: Systems, Connections, Details, January 2014

Architect Magazine, "Diagrid", October 2011

"555m Tall Lotte Super Tower, Seoul, Korea", Besjak, Charles, Bonghwan Kim, Preetam Biswas, ASCE International Structures Congress, Austin, Texas, April 2009.

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

Mustafa K. Abadan, FAIA
Design Partner
Skidmore, Owings & Merrill LLP

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Noteworthy for the unity of its structural and architectural expression, for the transitional nature of its form, and for its dual structural system, Lotte Super Tower has served as a genesis project, leading to new codes in Korea and setting the global standards for the use of diagrids in seismic zones.

The tower's design, arising from an uncommonly close collaboration between structural engineers and architects, simultaneously addresses issues facing each of the two disciplines. The tapering shaft makes for a particularly efficient distribution of the mixed-use program, which required varying lease spans; the individual planar triangles of the façade enable the transformation of the surface geometry from a relatively smooth surface at the base to a complex, faceted texture at the crown, giving the façade definition and creating a play of light and shadow.

Chuck's pioneering use of the dual structural system of exterior steel diagrid and interior reinforced concrete core gives the tower lateral resistance to wind and seismic effects. The tapering and changing geometry also serve to minimize oscillations created by varying vortex shedding pressures. Where a conventional structural system would need to counteract large wind forces, Chuck's system is more efficient and requires 20 percent less steel. The optimized diagrid also cuts the number of moment connections, or nodes, by more than half, generating additional savings in fabrication and construction.

Lotte Super Tower is a prime exemplar of the complete and organic synthesis of structural and architectural statement: it owes its stature as a bold, iconic architectural statement to its precedent-setting structural engineering design.

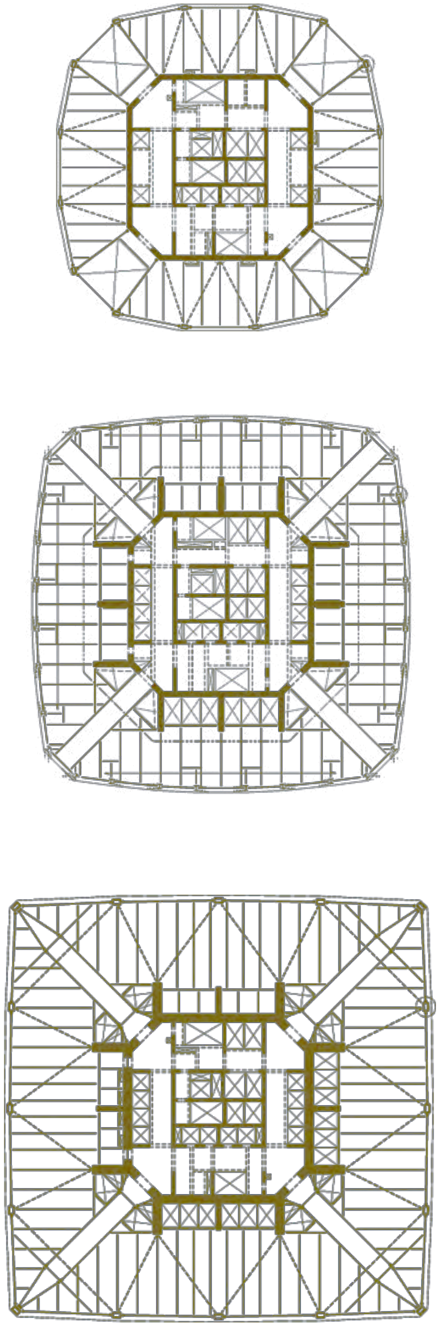


Figure 1.1 Typical structural framing plans.

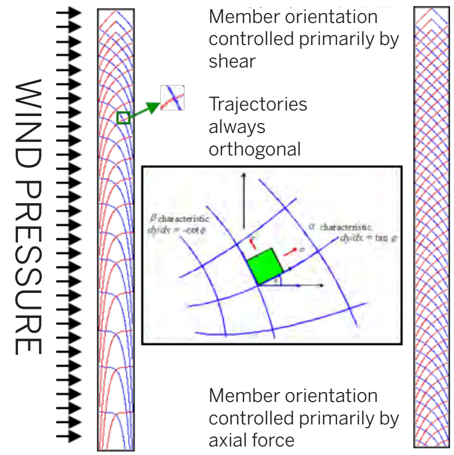


Figure 1.2 Principal stress trajectories for lateral load on tall buildings.

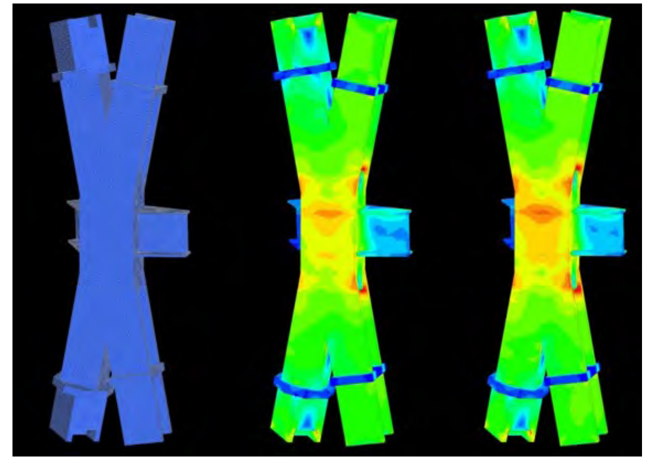
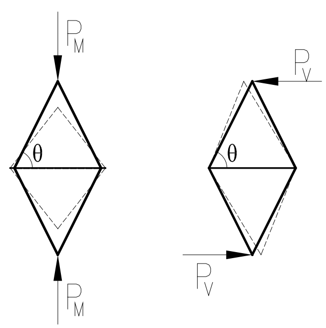


Figure 1.3 Three-dimensional analysis of typical diagrid node.

©

$$A \cdot \Delta = \frac{1+\cos^2(\theta)}{N \cdot \cos^2(\theta) \cdot \sin^2(\theta)} + \frac{L \cdot x \cdot \left[1+\cos^2(\theta)\right]}{D^2} \cdot \left[\frac{1}{\sin^2(\theta)} + \frac{1}{\tan^2(\theta) \cdot \sin^2(\theta)}\right]$$



where:

q – an angle of the columns in the story

Δ – drift of the top of the building due to deformation of the story

A – a constant describing the stiffness of the story

*D*² – property of the locations of the columns in the story

N – number of columns

L – moment arm (*M/V*)

x – distance of the story being optimized to the top of the building

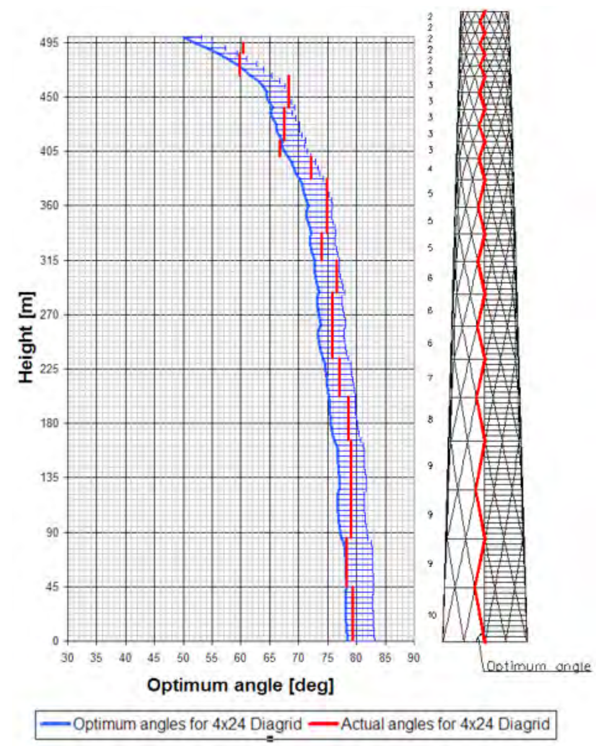
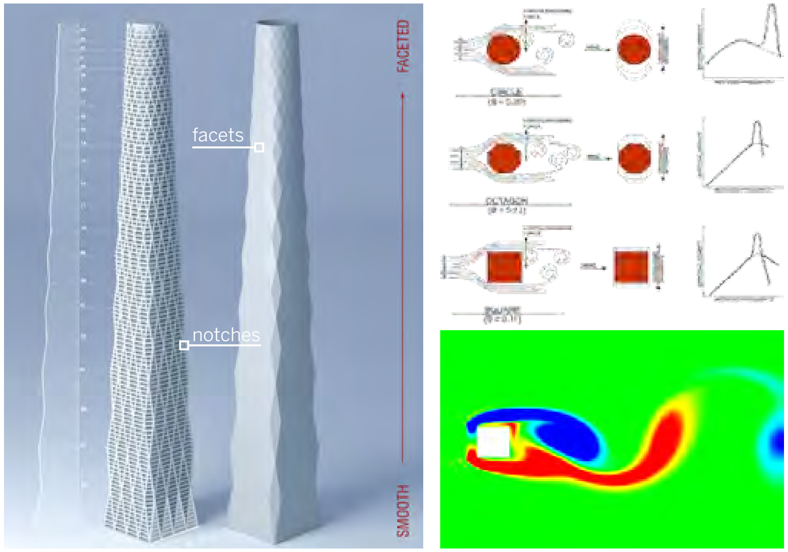


Figure 1.4 Theoretical optimum diagrid angle solution.

All images © SOM



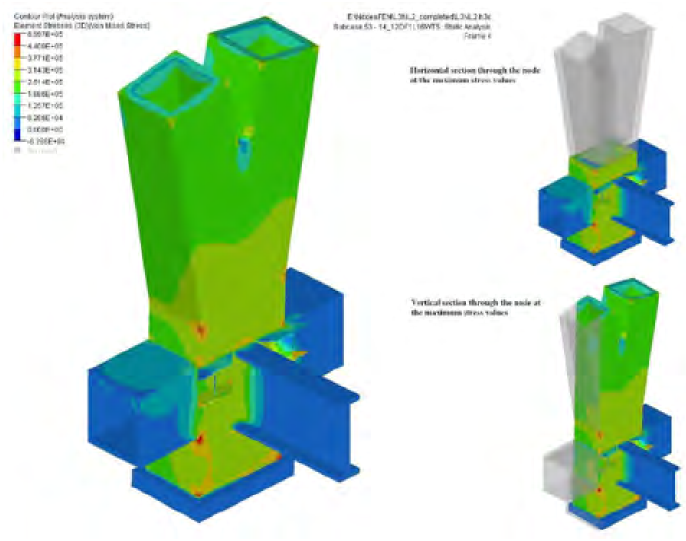
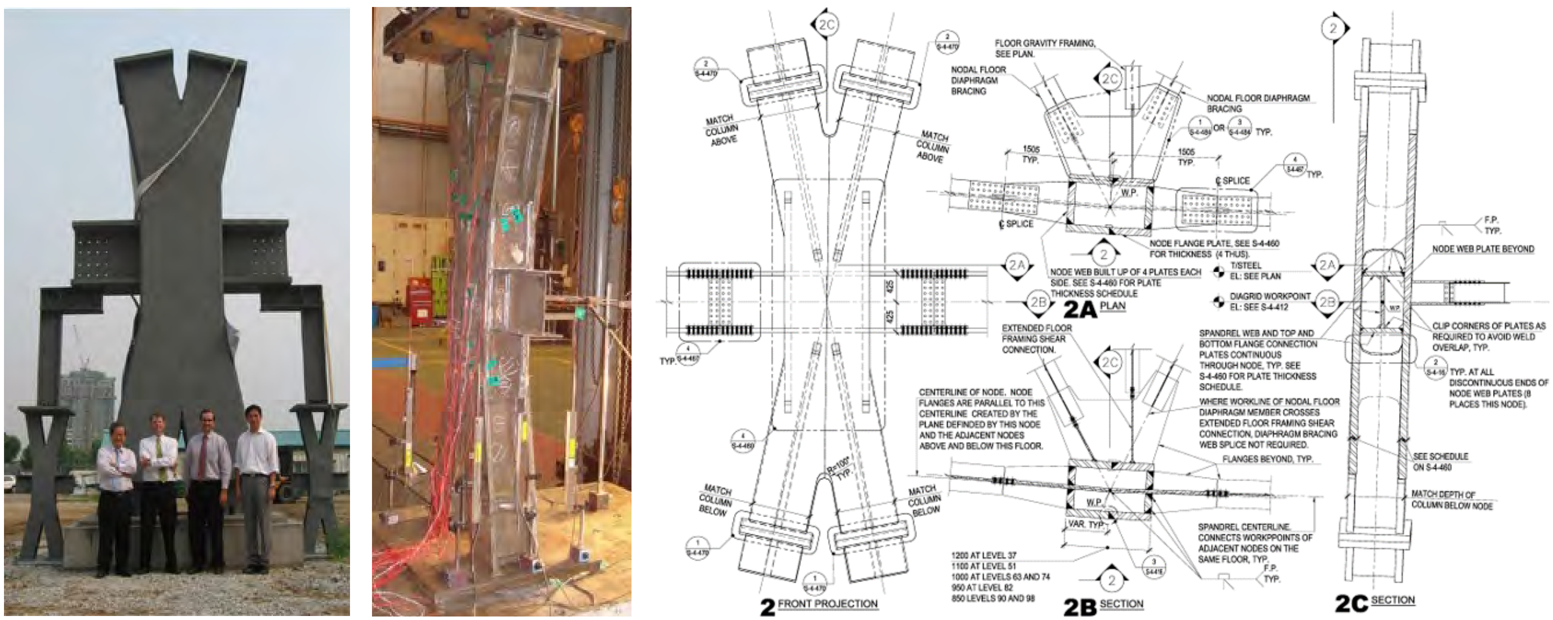


Figure 1.5 Facets and notches along its height create disturbances in the boundary layer and reduces vortex shedding and wind-induced motions.

Figure 1.6 Typical three-dimension node stresses.



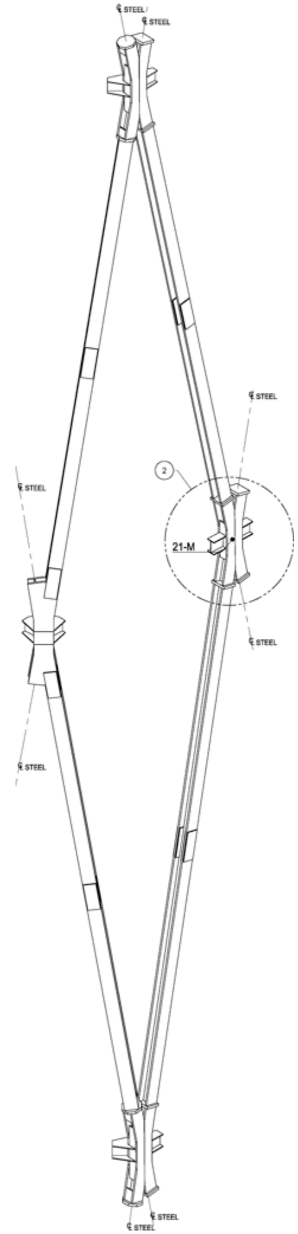


Figure 1.7 (From left to right) Full scale mock-up of typical node; Load test for typical scaled node; Construction documents of typical node (2, 2B, 2C, 2D).

3.2

United States Air Force Academy

Center for Character and Leadership Development

Colorado Springs, Colorado

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2015

AREA

45,500 sf

SELECT RECOGNITION

AIA Committee on Architecture for Education, Award of Merit, 2012

AIA - New York City Chapter, Honor Award, 2012

Chicago Athenaeum, International Architecture Award, 2012

Chicago Athenaeum, Green Good Design Award, 2012

“Center for Character and Leadership Development at the United States Air Force Academy”, Besjak, Charles, Preetam Biswas, and Raymond Sweeney, OSCE International Structures Congress, Pittsburg, PA, April 2013

Architect’s Newspaper, “Unveiled: US Air Force Academy”

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

Anthony Vacchione, AIA
Managing Partner
Skidmore, Owings & Merrill LLP

© SOM

The USAFA campus was designed in the 1950s by SOM and is based upon an inviolable 28-foot-square grid, which itself is a multiple of the seven-foot length of a cadet’s bed, a dimension that serves as the base unit for all the campus’ architectural features. The design for the Center for Character and Leadership Development (CCLD) thus arose from twinned tensions: the need to observe the foundational rigor and discipline of the architectural history and the objective of creating a distinctive new landmark. The CCLD is conceived as a “reason-based” icon, in counterpoint to the famous faith-based Cadet Chapel.

Chuck was responsible for the design of the CCLD’s most dramatic element, the 105-foot-tall glass and steel skylight that rises from the Honor Board Room, where potential violations of the Academy’s honor code are investigated and adjudicated. Anchored in the grid, the skylight springs upward and off the grid at an angle such that a cadet sitting in the Honor Board Room is always in optical alignment through the oculus with the North Star, or Polaris, the symbol of navigation that is emblematic of the Academy’s mission.

The structure of the skylight consists of diagonal steel plates—intentionally landing every seven feet—composed in a triangular grid and precisely calibrated to resist the lateral forces produced by wind loading. The architecturally exposed structural steel is devoid of all embellishment or ornamentation, and its sleek connections are cohesive with the aesthetics of the structure. With its complete integration of architecture and structural engineering, dynamic nature of the form, and machine-like precision, the skylight evokes the fluidity and aerodynamics of aircraft design.

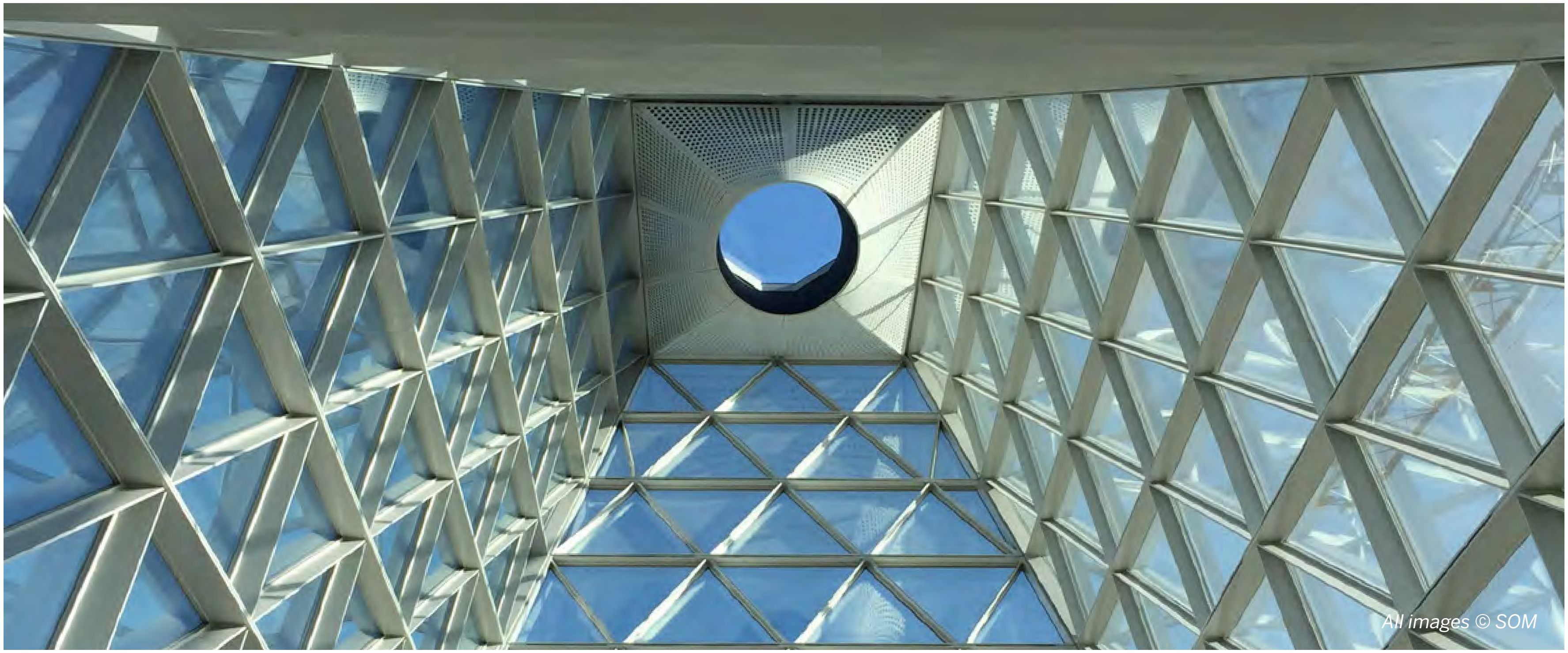


Figure 2.1 View of skylight looking up.

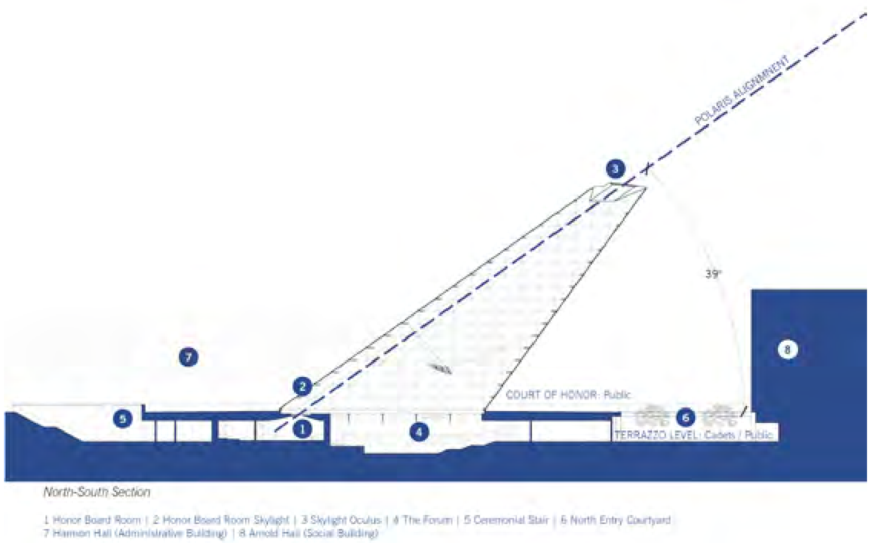


Figure 2.2 Section view depicting alignment with the star, Polaris.

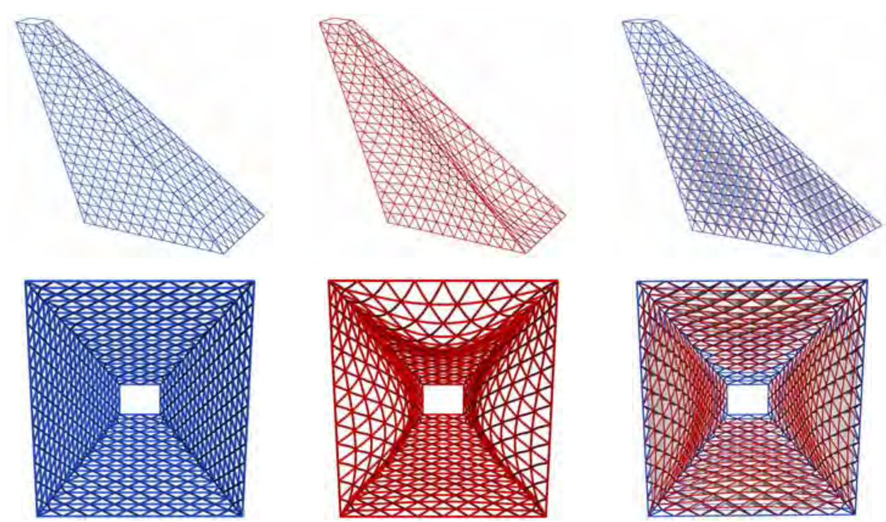


Figure 2.3 (From left to right) Original skylight geometry; Deformed skylight geometry; Resultant skylight geometry.

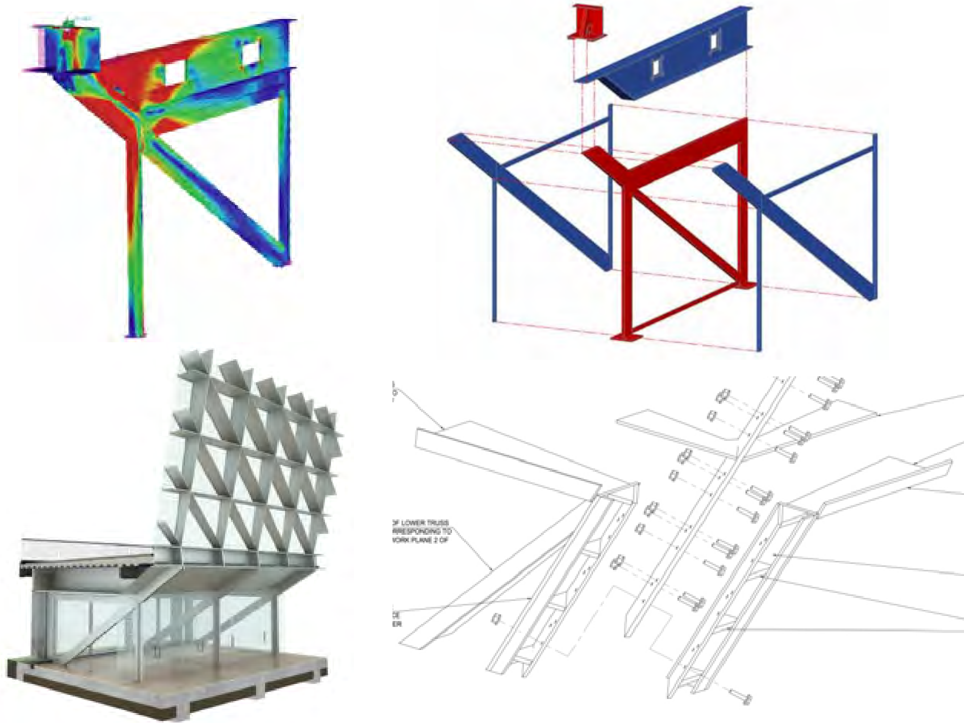


Figure 2.4 (Clockwise from top left) Skylight supporting frame, stress distribution; Skylight supporting frame exploded view; Exploded view of skylight corner assembly; Model of skylight support assembly.

Figure 2.5 Multi-purpose forum at base of skylight.

3.3 Mumbai International Airport
Chhatrapati Shivaji International Airport, Terminal 2
Mumbai, India

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2014

AREA

4,840,000 sf

SELECT RECOGNITION

2015 International Structures Over $100M, Outstanding Project, National Council of Structural Engineers Association (NCSEA)

2015 Award of Excellence for Architectural Engineering Integration, Architectural Engineering Institute (AEI)

Architectural Engineering Institute (AEI), Award of Excellence for Architectural Engineering Integration

ArchDaily, "Building of the Year 2015", 2015

Architecture Update Magazine, "An Infrastructure Renaissance", 2014

Forbes, "India's Time for Growth", 2014

Architectural Record, "Airport Terminal is a Trove of Art", 2014

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

Laura Ettelman, AIA
Managing Partner
Skidmore, Owings & Merrill LLP

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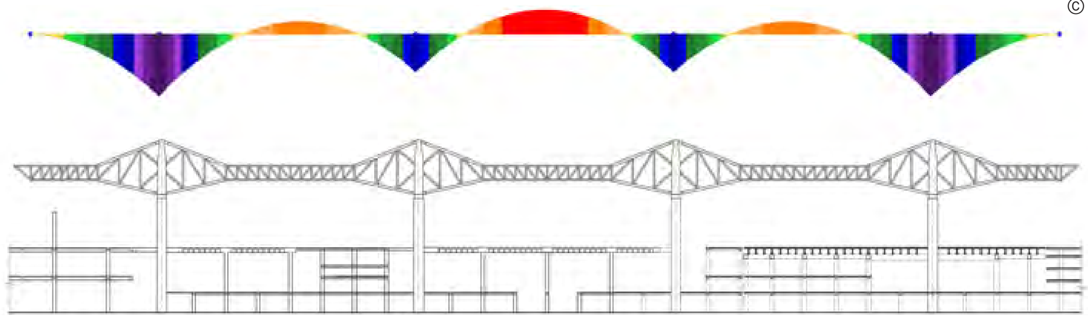


Figure 3.1 Structural bending stress diagram used as inspiration for the final headhouse truss configuration.

The newly completed 4.8-million-square-foot Terminal Building is among the world's busiest, with a capacity of 40 million passengers per year. It also features two particularly stunning elements: a 17-acre long-span roof, one of the largest in the world without an expansion joint; and, at more than half of a mile in length, the world's longest continuous cable wall. Chuck brought equal parts architectural and structural engineering vision to the underlying concept and development of these innovations.

The roof gives the Terminal its defining form, covering the departures roadway, check-in hall, and security and passport control functions. The headhouse roof, covering 753,500 square feet, spans over seven individual concrete base structures. To create the open space required by the program, Chuck developed a design calling for just 30 composite mega-columns, which rise 131 feet, the full height of the terminal, passing through openings in each of the four floors and culminating in a 111-foot-wide capital. A significant portion of the roof is open to the outdoors and behaves like a canopy.

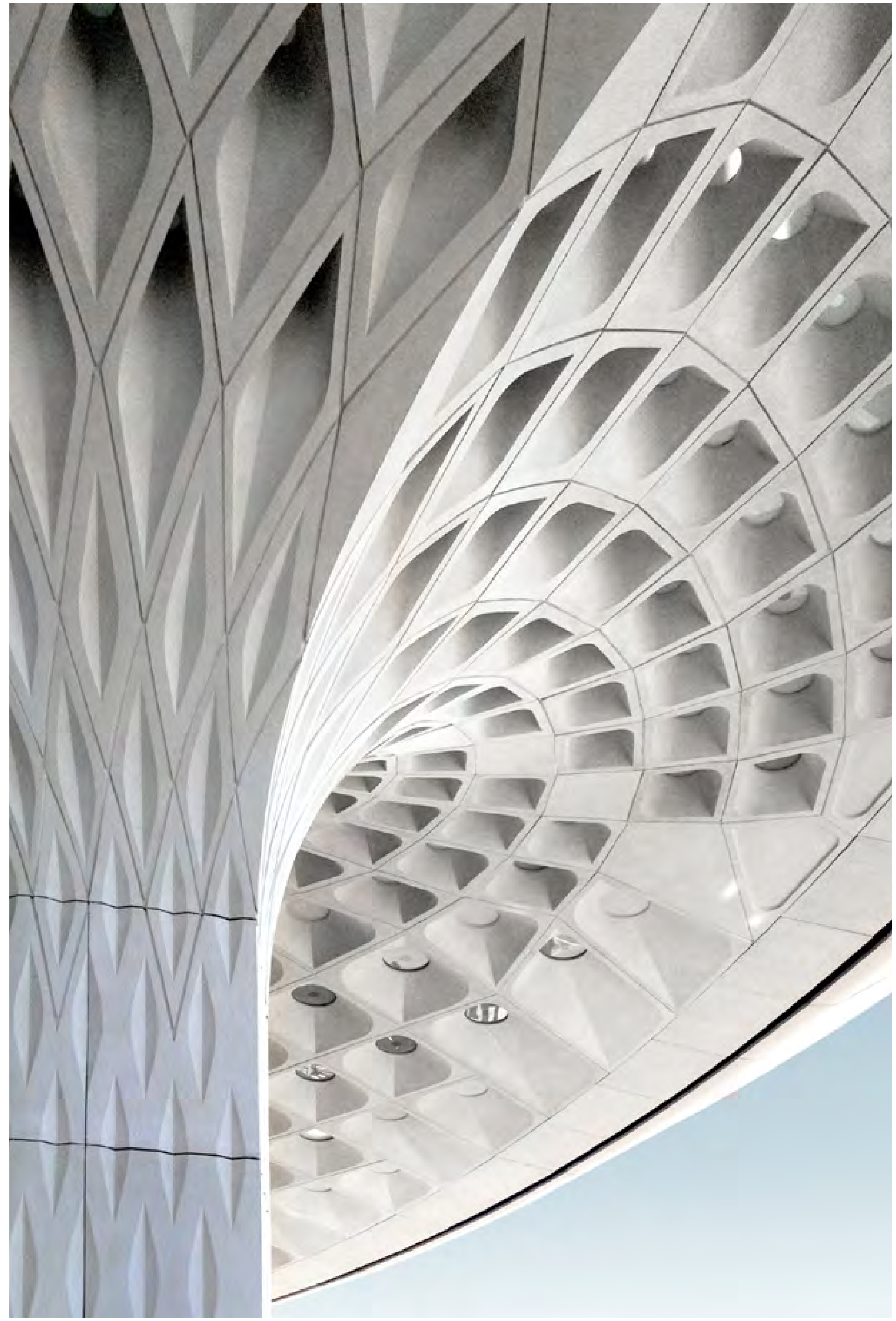
The cable wall, with an area of more than 118,400 square feet, surrounds the terminal building. Absent of building structural elements to anchor horizontal cables, Chuck designed the system as a unidirectional cable wall that spans between the structural headhouse roof and four independent portions of the concrete terminal building. Expansion joints are located where the cable wall crosses separate structures, to allow individual segments of the wall to move independently. Chuck introduced several innovative features not found in other cable wall systems, including curves, corners, and entrance vestibules.

Figure 3.2 Photography series depicting the stages of column pod installation over construction period.

Figure 3.3 Cable-wall system

Figure 3.4 Check-in concourse

Figure 3.5 Upwards view of column pod



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3.4 Denver Union Station Hub

Denver Union Station Project Authority

Denver Union Station Hub

Denver, Colorado

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2014

AREA

1,623,000 sf

SELECT RECOGNITION

American Institute of Steel Construction (AISC), National Award for Excellence in Steel-Frame Building Design (Less Than $15M), 2015

AIA, Institute Honor Awards for Regional & Urban Design, 2014

NCSEA, Excellence in Structural Engineering, 2014

The New York Times, "Refurbished Stations From Denver to Tokyo", 2015

Civil Engineering, "Denver Designs an Intermodal Powerhouse", 2014

Architectural Record, "Denver Union Station is a "Game Changer", 2014

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

Anthony Vacchione, AIA
Managing Partner
Skidmore, Owings & Merrill LLP

Figure 4.1 (From left clockwise) Construction photo of roof structure; structural node; fabrication of chord elements.

A major goal for the City of Denver in the creation of this new facility was to elevate transportation-related structures to the status of civic buildings, to become a catalyst for new development while also respecting the landmarked historic station building. The focal point of the project is the train hall structure, an efficient and formally expressive means of clear-spanning 180 feet across multiple railway tracks. It is also an elegant and iconic example of creativity inspired by constraint—in this instance, a budget that fell woefully short of what would ordinarily be needed to fulfill the project's functional, structural, and aesthetic goals. Chuck's innovative design approach and extensive coordination resulted in a conventionally constructed steel structure that is a model for the expressive use of structural steel.

Chuck began by designing a system consisting of 11 steel arch trusses rising from a single large-diameter pin connection atop 18-foot-tall arched column supports. The arch trusses and cantilevered trusses support a tensioned PTFE (polytetrafluoroethylene) fabric canopy, that rises to a height of 70 feet at the head-end platform and swoops down dramatically to 22 feet at the center before rising again at the far end. While the geometry is complex, Chuck kept its realization simple and rational, enabling many standard fabricators to bid for the work and keeping the costs down.

Because every structural connection and member is an architecturally expressive element, Chuck and his team carefully and fully detailed them in the contract drawings, to fully control the design. By eliminating fabricator connection engineering, this approach saved time and money. Further to meet the stringent budget, Chuck engineered the connections to use only conventional techniques and materials. And the requirement for Architecturally Exposed Structural Steel (AESS) was confined to those aspects of AESS that were essential to the project's success.

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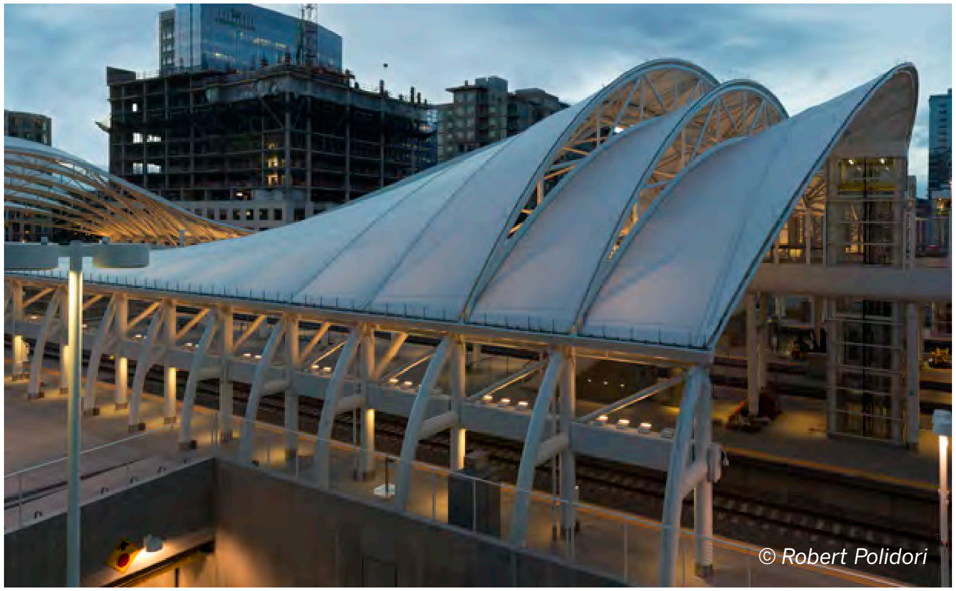

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© Ryan Dravitz

3.5

The Guangzhou Pearl River Tower Properties Co., Ltd

Pearl River Tower

Guangzhou, Guangdong, China

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2013

AREA

2,300,000 sf

SELECT RECOGNITION

NCSEA - Northern California, Award of Excellence: Sustainable Design Category, 2015

Chicago Athenaeum, Green Good Design Award, 2011

Architizer, A+ Award: Office Building High Rise - Finalist, 2014

International Property Awards Commercial Highrise China Award, 2014

Spark Awards, Green, Carbon-Lowering & Environmental Category: Gold, 2013

"Pearl River Tower: Design Integration towards Sustainability", Besjak, Charles, William Baker, Brian McElhatten, Xuemei Li, ASCE International Structures Congress, Boston, MA, April 2014

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

William F. Baker, PE, SE, FASCE
Structural Partner
Skidmore, Owings & Merrill LLP

© Tim Griffith

© Si-ye Zhang

Architecture and structural engineering were dependent upon and informed by each other from the genesis of the concept for the design of the 1,000-foot-tall tower. Its fluid shape balances performance and aesthetics and redefines what is possible in super-tall sustainable design.

Chuck's concept for the tower's structure involved inserting wind turbines in a pair of openings in each of the two mechanical floors, at levels 24 and 50. The vertical axis turbines capture and harness the prevailing winds that generate power for the building. Based on a thorough analysis of wind patterns around the site, the tower's curvature serves to enhance its aerodynamic properties, optimizing the air pressure difference between the windward and leeward sides of the building and initiating airflow through the tunnel openings. The wind velocity is thus maximized, as is the potential energy generated by the system. Combined with the latest in green technology, the sculpted, sleek building is 60% more efficient than a conventional tower of the same size and has been recognized as the genesis project for super-tall sustainability.

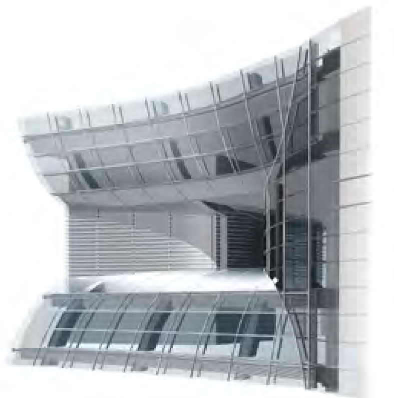


Figure 5.1 MEP floor fuselage opening.

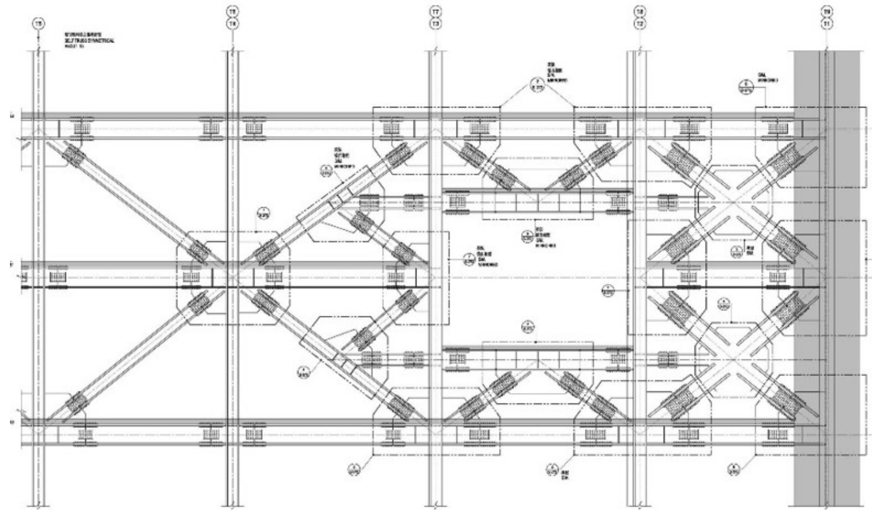


Figure 5.2 Structural belt truss optimized around maximizing wind turbine power.

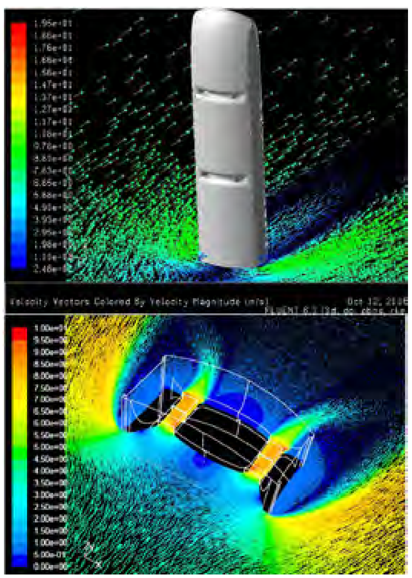


Figure 5.3 Wind tunnel flow analysis through building fuselage openings.

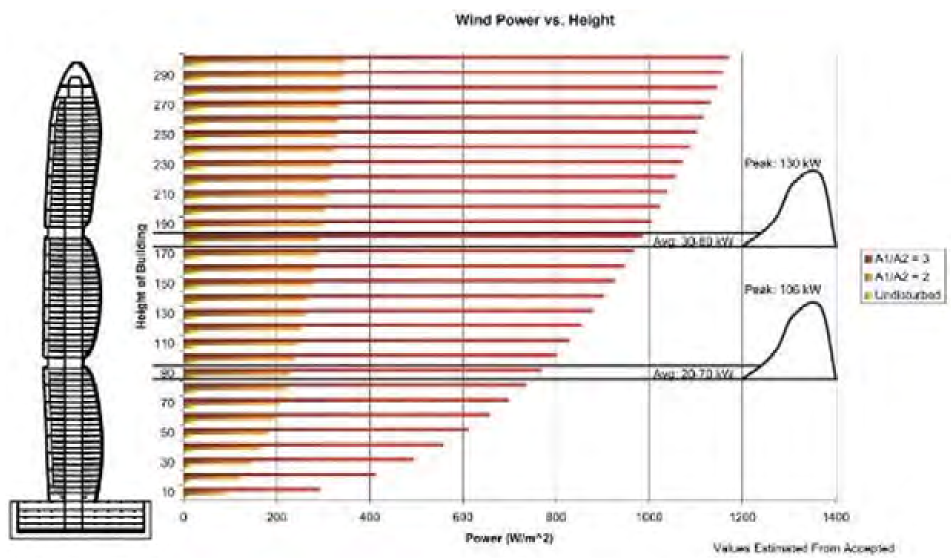


Figure 5.3 Analysis of wind power vs. height.

Figure 5.4 Construction photo of tower.

3.6

Nanjing Greenland International Commercial Center

Zifeng Tower

Nanjing, Jiangsu, China

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2009

AREA

3,320,000

SELECT RECOGNITION

Structural Engineers Association of Illinois, Best International Project Over $150 Million, 2012

"Performance-Based Evaluation for the 450m Nanjing Greenland Financial Center Main Tower", Besjak, Charles, Brian McElhatten, Preetam Biswas, CTBUH Journal, 2009 Issue II.

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

William F. Baker, PE, SE, FASCE
Structural Partner
Skidmore, Owings & Merrill LLP

© HanjoH

On its completion in 2009, the 1,500-foot Zifeng Tower was the fifth tallest in the world and the second tallest in China. While that kind of statistic is always a point of great pride in China, the tower is substantially over the Chinese code limit of 620 feet for a concrete core/steel frame structure, and it is articulated and stepped in response to various functions—office, hotel, restaurant, and public observatory. As a consequence, the building was defined as an over-limit and complex structure under the code, necessitating innovative evaluative measures and engineering design solutions.

Zifeng Tower was not Chuck's first super-tall, extra-code project in China; and all required additional design and analyses to prove their seismic behavior and gain approval. But the novelty and complexity of this project brought an unusually large group into the seismic review process: a national panel of experts from universities and design institutes from across China, Chuck and his team, and the East China Architectural Design and Research Institute.

As the structural design and review processes proceeded, Chuck's vast knowledge and expertise, combined with his collaborative approach, enabled a quick and consensus-based adoption of the seismic and design standards to be applied or modified. Absent a prescriptive code, however, it remained to develop the means to prove the ultimate stability of the structural design. Chuck's innovative solution was an elasto-plastic analysis to confirm the behavior of the building under a 2,500-year earthquake, defined as "major" under Chinese code. The "Nonlinear Elasto-Plastic Transient Dynamic Analysis Using Time History Curves" required enormous amounts of data and computing power to ensure that every relevant element of the design—its nature and behavior—was accounted for. The results of Chuck's efforts were a very efficient structure, seismic design approval, and the establishment of a state-of-the-art method of performance-based evaluation.

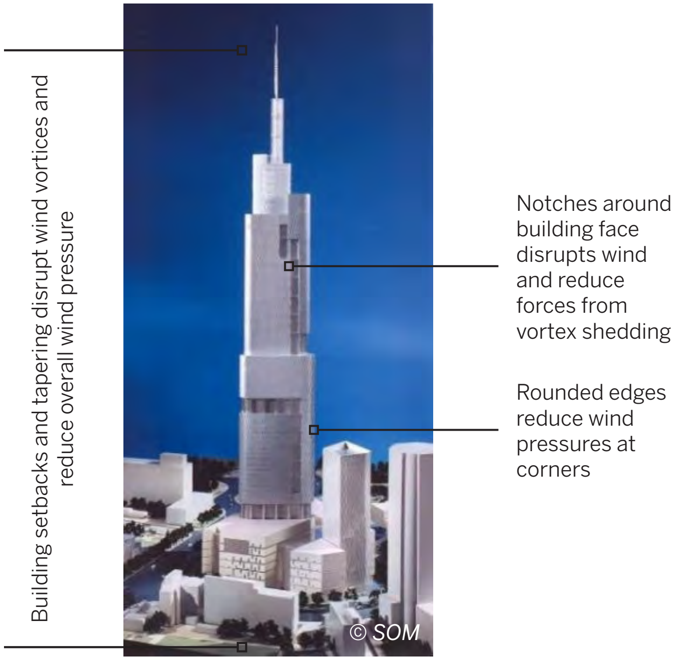


Figure 6.1 Detail of scalloped exterior wall surface used to mitigate wind forces.

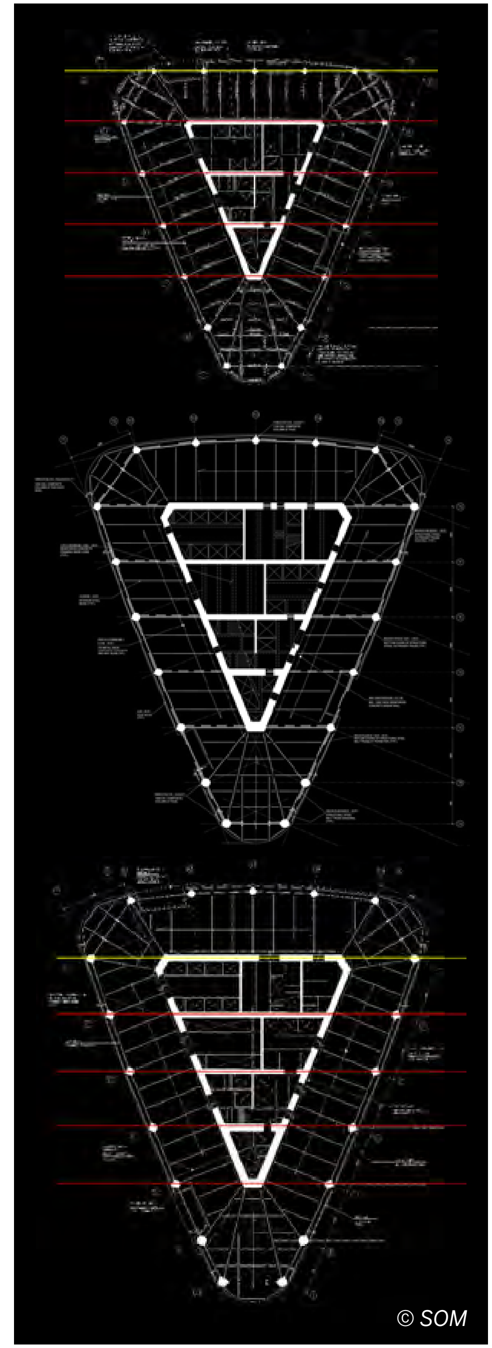


Figure 6.2 Structural floor framing plans (Top to bottom) Upper floor; Outrigger floor; Typical lower floor.

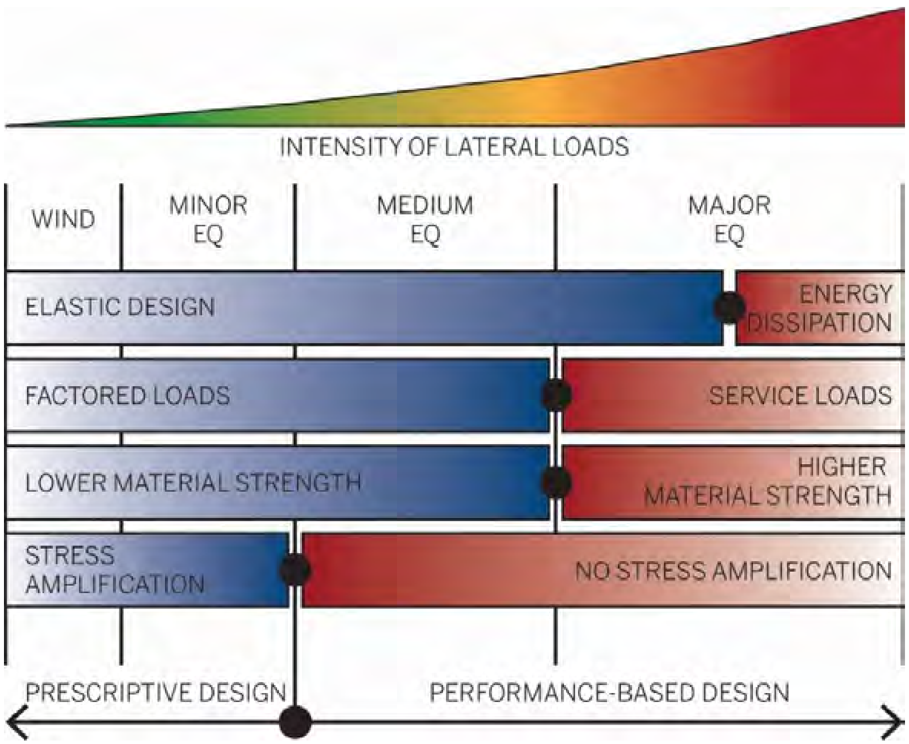


Figure 6.3 Performance based design criteria to establish acceptability for Chinese seismic experts.

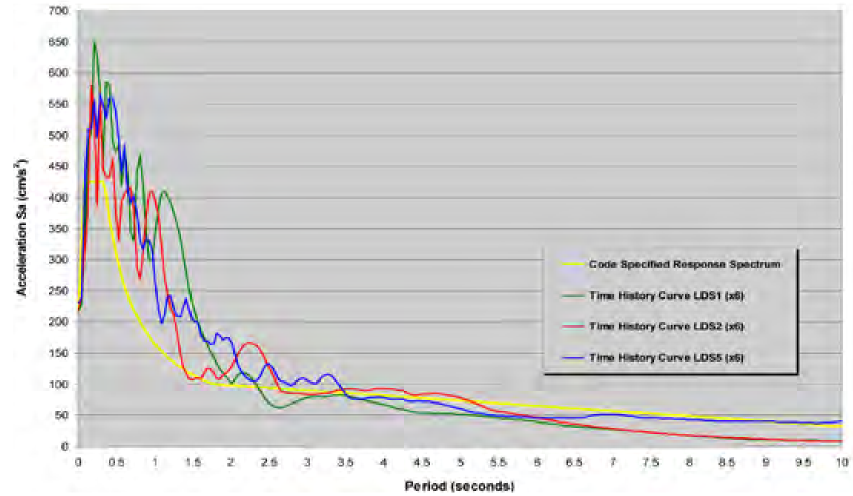


Figure 6.4 Response spectrum and time history curve comparison.

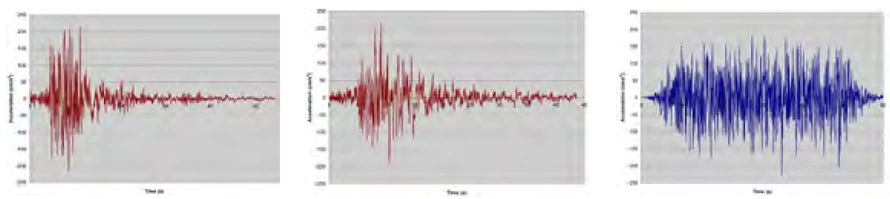


Figure 6.5 (From left to right) Real time history curve - LDS1; real time history curve - LDS2; Simulated time history curve - LDS5.

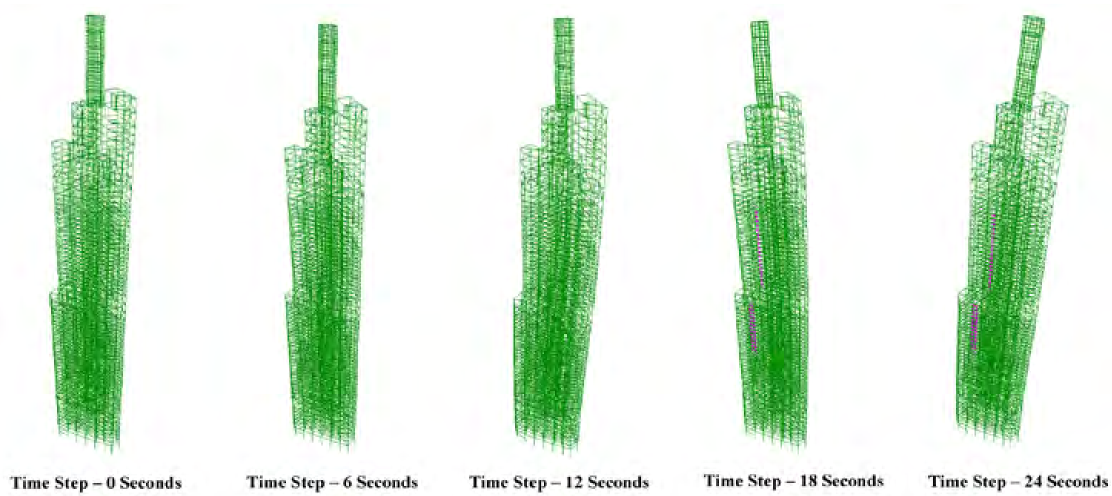


Figure 6.6 Building response for time history LDS2 - Y Direction with elasto-plastic hinge formations.

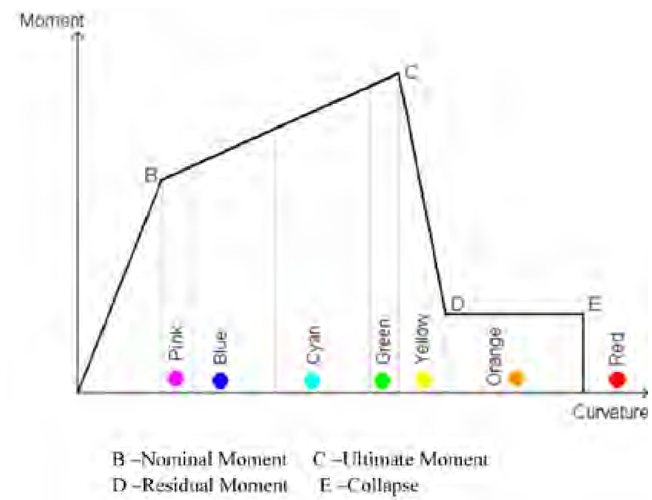


Figure 6.7 SAP 2000 Hinge Color Coding criteria for acceptability under major earthquake.

3.7 General Motors
Renaissance Center - Entrance Pavilion
Detroit, Michigan

ARCHITECTURE FIRM OF RECORD

Skidmore, Owings & Merrill LLP

DESIGN FIRM

Skidmore, Owings & Merrill LLP

ROLE

Lead Structural Engineer

COMPLETION

2004

AREA

3,619 sf

SELECT RECOGNITION

Urban Land Institute, Award for Excellence: The Americas, 2008

NCSEA, Excellence in Structural Engineering Award of Merit, 2006

American Council of Engineering Companies of Michigan, Engineering and Surveying Excellence Award, 2005

"Glass cable-net entrance pavilion for GM Global Headquarters", Besjak, Charles, William Baker, Proceedings: Glass in Buildings, Bath, UK April 1999.

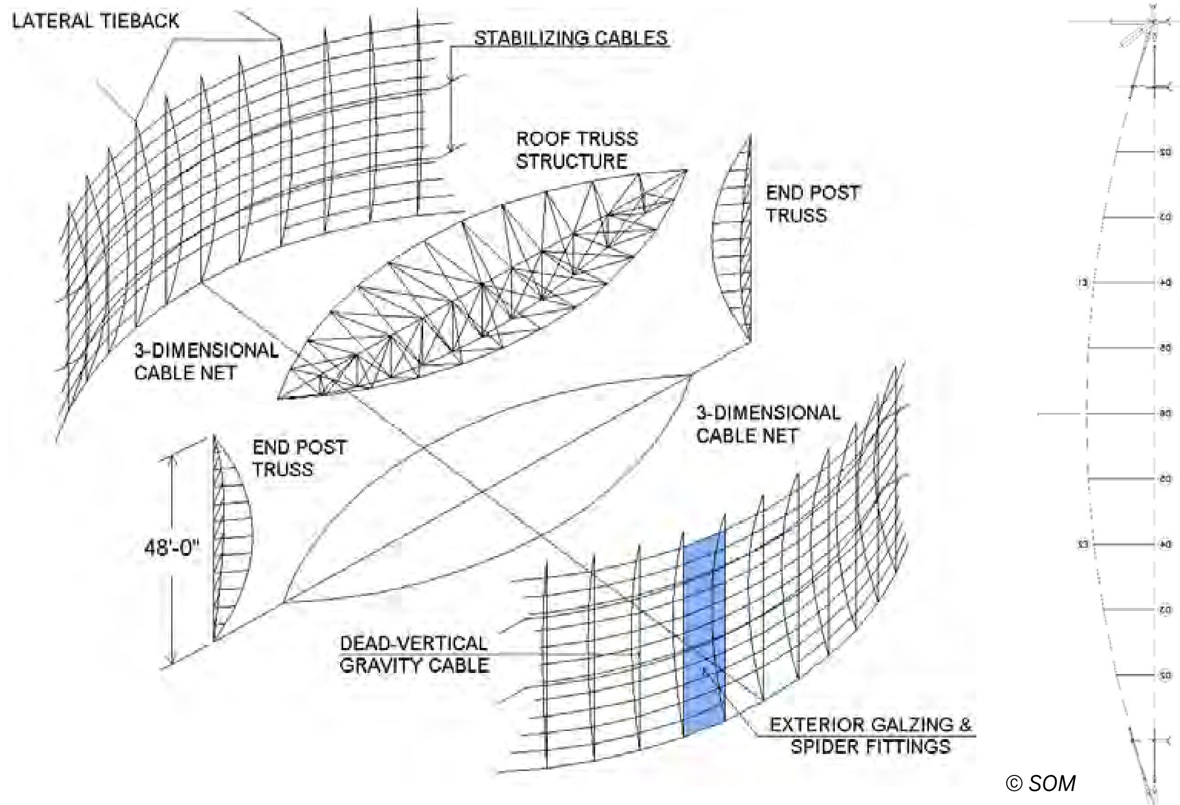


Figure 7.1 Exploded three-dimensional view of structural system heirarchy.

In designing the new entrance pavilion for GM's Detroit headquarters building, Chuck was charged with expressing the principle of engineering excellence that is central to the corporation's brand identity. His design concept uses a high-tech, machine-like aesthetic that results in a dramatic minimalist structure of glass and cables.

The free-standing lens-shaped structure—also serving as a display case for new GM products—uses anticlastic cable-nets on its two vertical faces to support the all-glass walls. Two columns at each end of the structure are connected by a bow truss that supports the glass ceiling. Chuck devised the lens shape to provide two circular arcs of cables that are pre-stressed against parabolic vertical cables, resulting in a geometrically stiffened cable-net that resists uniform and non-uniform wind pressures and suctions. The structural members clearly express the magnitude of forces associated with them: the cables identify all the tension members in the system, while the very slender pipe sections are used for compression and bending-type members. The result is a self-stressed system where the tension and compression elements are clearly expressed and the pavilion overall reveals a wholly integrated architectural and structural engineering aesthetic.

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for the design of the project listed above.

William F. Baker, PE, SE, FASCE
Structural Partner
Skidmore, Owings & Merrill LLP

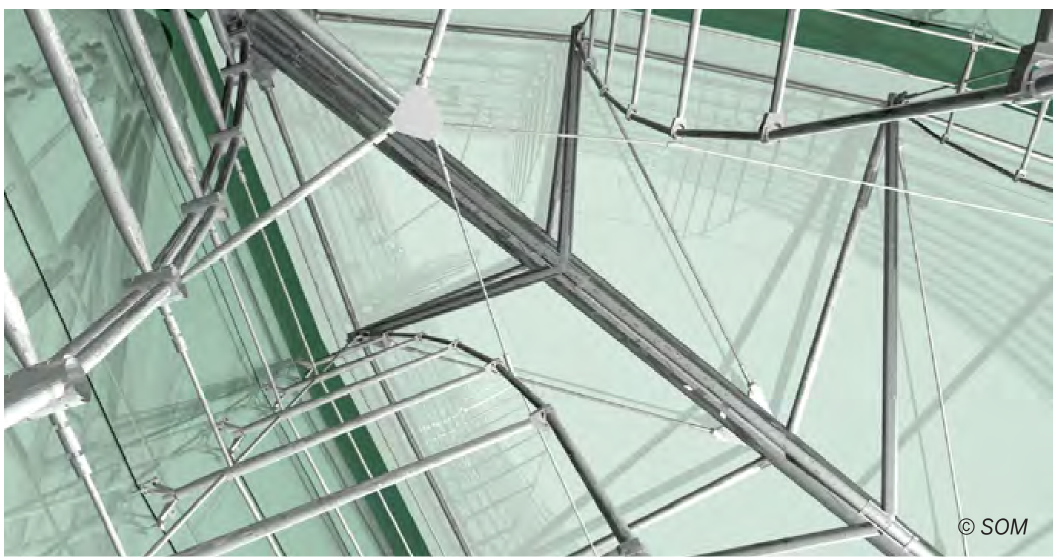
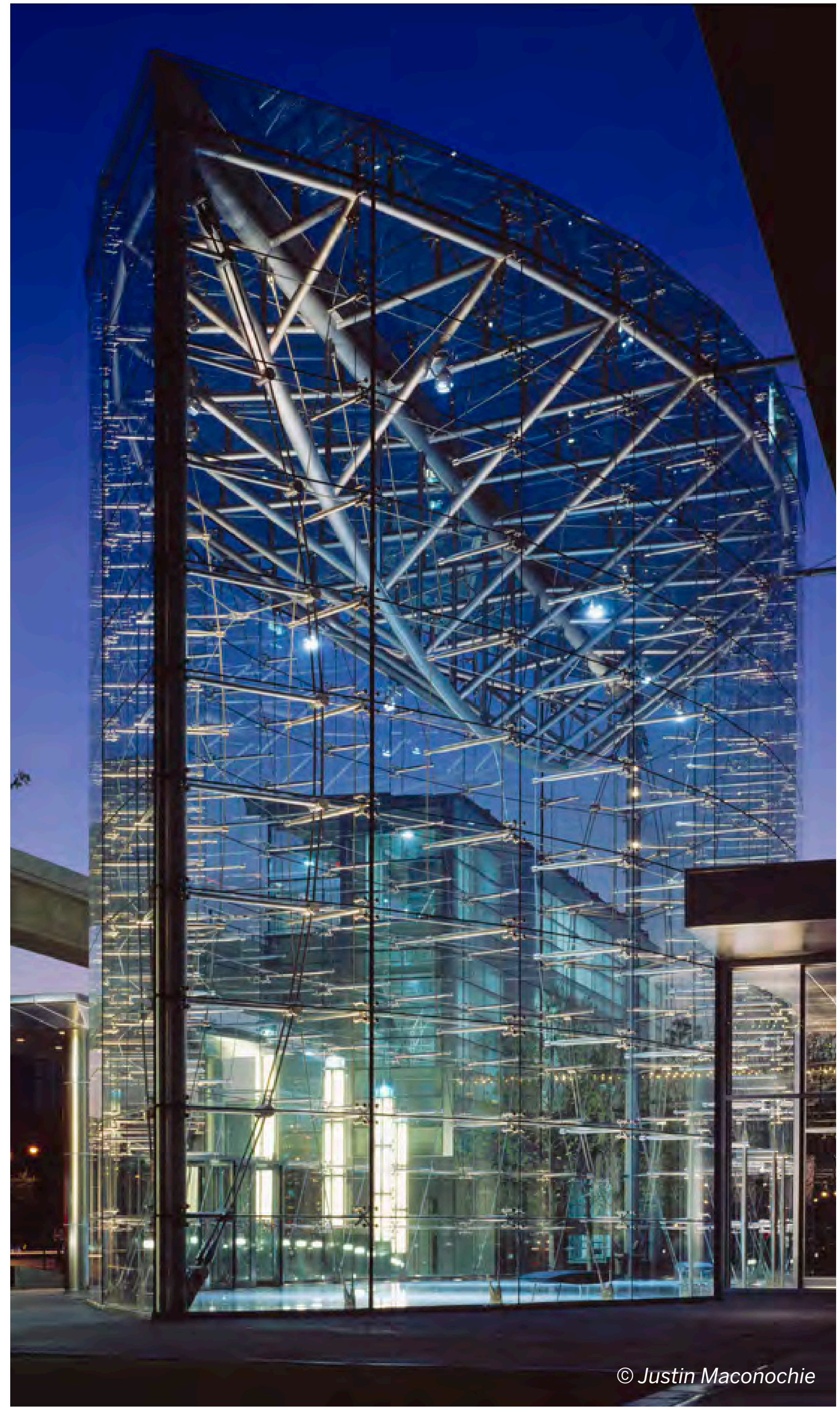


Figure 7.2 Upward view of the anticlastic cable-net support system within the pavilion.



4

4.1 REFERENCES

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