

CTBUH Journal

International Journal on Tall Buildings and Urban Habitat

Tall buildings: design, construction and operation | 2010 Issue I

The Standard Hotel, New York

The Remaking of Mumbai: A CTBUH-IIT design studio

Structural Design of Reinforced Concrete Tall Buildings

CTBUH changes height criteria

Historical evolution of the service core

2009: A Tall Building Review



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Front cover + back cover: *The Standard Hotel, New York*
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Zak Kostura, Editor

At the tenth annual Dubai Motor Show last month, German automaker Mercedes-Benz stole the spotlight with its successor to the legendary McLaren, the SLS AMG. Although the veil had been publicly lifted from this new model in other cities earlier in the year, it was in Dubai that it first appeared in a high gloss finish dubbed by Mercedes as "*AMG Desert Gold*". The paint job was a luminous acknowledgment of the Emirate's relatively newfound but prestigious standing in the annals of global finance. A press release from the German automaker described the paint choice as a "*token of respect for the Middle East*".

It was enough to divert attention from the rather antithetical news stories of the previous day; that of Abu Dhabi's surprise bailout for Dubai, its holdings and their subsidiaries. While the cars may still be gold in Dubai, the faces of investors are green, as many explore the strong possibility that sovereign debt could result in another wave of global credit defaults. And their collective uneasiness is stoked by a local real estate market launched so far into the stratosphere that it is unclear to anyone what it will look like when it lands.

The new CTBUH Tall Buildings Database, up now on the Council's website, lists 79 notable tall buildings in Dubai. Combined, these towers amount to more than 34 vertical kilometers of building edifice. Of this height, nearly 19 kilometers (54%) remains under construction. This number reflects a staggering amount of real estate yet to hit the Dubai market, and as it does the landscape of investment in tall buildings – and luxury space in particular – may change dramatically.

The spectre of sovereign debt defaults in emerging markets and the resounding fallout of vast quantities of real estate coming online from the previous building boom are but two of many factors that will affect tall building investment in the future. Even markets such as China, which appear beyond the influence of these factors, may be affected by such recent events as the global summit on climate change in Copenhagen, where murmurs of border tariffs were overheard among negotiators as they discussed consequences of failing to reach binding agreements.

While the investment world waits to see what the future holds for tall buildings, money-makers, governments, planners, sociologists and others continue to assert that a prosperous and sustainable future must assuredly involve tall buildings as mechanisms for successful urban densification. This issue focuses on tall buildings in numbers – as statistics, through their systematic evolution over time, and as conceptual solutions for overcrowded developing cities.

The papers reflect a search for universal solutions, not merely tall building icons. The Journal – the title of which has been expanded to assert its relevance to the broader tall buildings industry, now the "*International Journal on Tall Buildings and Urban Habitat*" – aims to address such solutions to facilitate the use of the tall building typology to foster better urban living and a sustainable future. It will also be doing this under the leadership of new CTBUH Chairman, Professor Sang Dae Kim, and an expanded circulation that involves 4 issues per year. On behalf of the Council, I hope you enjoy the issue.

Best Regards,



Zak Kostura

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Case Study: The Standard Hotel, New York

"The building is a destination, both visually and experientially, realizing the client's conceptual goal to create a 'living room for the neighborhood,' a public place where hotel guests and pedestrians can co-mingle in a variety of spaces."



...re-cladding

The building's facade is a key feature, with a mix of materials and colors that create a unique visual identity. The design team worked closely with the client to ensure the building's appearance reflected the surrounding urban environment while maintaining its own character.

The building's location in a prime urban area makes it a highly visible landmark. The design team focused on creating a building that would stand out in its environment while also contributing to the overall quality of the neighborhood.

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The Remaking of Mumbai: A CTBUH-IIT collaborative architectural design studio

"The five towers rise up from the urban plane, connected by a sinuous, landscaped bridge that starts at the ground and weaves its way up around and between the towers, culminating in a giant urban park in the sky: a horizontal plane connecting the towers and leading the separate schemes and design agendas into one 'wick.'"



The design studio explored various architectural solutions for the Mumbai project, focusing on creating a cohesive urban environment. The proposed towers and bridge represent a new approach to high-rise development in a dense urban setting.

The design team worked closely with local stakeholders to ensure the project would benefit the community and contribute to the city's growth. The resulting design is a blend of modern architecture and traditional urban planning principles.

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Structural Design of Reinforced Concrete Tall Buildings

"The development in concrete technology over the twentieth century covering materials, structural systems, analysis and construction techniques, made it possible to build concrete tall buildings such as Petronas towers (452m), Jin Mao (421m) and Burj Dubai (828m)."



The article discusses the evolution of reinforced concrete structures for tall buildings, highlighting key technological advancements. The Petronas towers, Jin Mao, and Burj Dubai are cited as examples of successful high-rise concrete structures.

The design process for these buildings involved complex structural analysis and innovative construction techniques. The use of reinforced concrete allowed for the construction of tall, slender structures that could support their own weight and external loads.

“This is a really fascinating studio because it’s deliberately using tall buildings to try and explore solutions to some of the great challenges that exist in all of our cities today.”

David Scott, Studio Reviewer (CTBUH Chairman and Principal at Arup), page 22



© Taipei Financial Center Corporation

Taipei 101 to become World's Tallest Green Building

Joining the Empire State and Willis Tower as existing buildings seeking LEED certification, Harace Lin of Taipei 101 has announced that they are applying for a LEED rating. While the Empire State and Willis Tower have applied to remain competitive within the commercial market, Taipei 101's motivation is to fight global warming.

Taipei 101's consultants for the LEED rating are Steven Leach Associates, Eco Tech International, and the Building Automation Business Unit of Siemens. The tower contains 85 businesses and 10,000 employees. The 20-month renovation is expected to cost NT\$60 million. It will reduce energy use by 10%, water use by 10%, and divert 10% of the

waste from landfills. The energy savings alone is estimated to save NT\$20 million annually.

In addition to data collection and analysis, the LEED rating includes educating building occupants and modifying management policy. Improving indoor air quality, for a healthier environment, is also an aim in the LEED rating.



© RMJM

Capital Gate Tops Out in Abu Dhabi

The Abu Dhabi National Exhibitions Company has topped out the central core of its new hotel. To be called 'Hyatt at Capital Center', the hotel will be the first Hyatt hotel in Abu Dhabi. While the Capital Gate's final height of 160 meters is no longer considered exceptional, its 18-degree lean from vertical certainly is.

Leaning 14 degrees more than a famous tower in Pisa, Capital Gate will become the iconic centerpiece of the Capital Center residential and business development. Along with the Hyatt at Capital Center, the tower will contain a tea lounge on level 18, which juts out over the façade. An open sun terrace and a swimming pool, with views of Abu Dhabi, are also planned for the tower.

Designed by architectural firm RMJM and constructed by contractor Al Habtoor, the 18-degree lean posed unique problems. The tower has a complex steel diagrid to counter the non-symmetrical forces from gravity, wind, and seismic. It sits on a raft foundation with a dense distribution of steel rebar. The foundation is sitting on a complex matrix of piles that have been drilled up to 30 meters underground.



© PA

BT Tower Enjoys New Life in London

The BT Tower has been a part of the London skyline since 1965. At a height of 581 feet, it cost 2 million English pounds and required four years to construct. Although a tower and not a building, its height and notable eateries at the top have gained it landmark status in London.

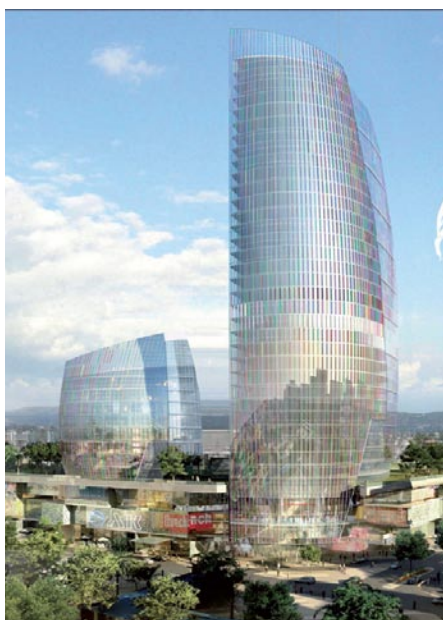
...net-zero-energy

“We don't have the data to give developers the confidence that the net zero energy systems work.”

Russell Gilchrist, Director of the Chicago office of Skidmore, Owings & Merrill on why the design of the Pearl River Tower in Guangzhou will not be the net-zero-energy building that its architect-engineer envisioned. From 'Boosters Try To Stay Upbeat During Slump', Engineering News Record, October 28, 2009

The last few decades have not been good for this tower. While it boasted celebrity status with its 'Top of the Tower' restaurant years ago, there have not been operating restaurants in it since 1980. Security concerns have also prevented commercial interests from occupying it. However, new life is emerging as London will host the 2012 Olympics.

Fireworks, to mark the 1,000th day before the Olympics, were fired from the top of the tower. Giant LED displays will countdown days as the Olympics approach. As a beacon for the city, there is renewed interest for a restaurant to reoccupy the top floors again. Happy days may again return to an old icon in London's skyline.



© FXFOWLE Architects

Designs for new mixed-use development in Ethiopia's capital

The New York City architectural firm FXFOWLE has designed a multi-use development for Addis Ababa, Ethiopia. Located in the capital of Ethiopia, the center is to serve the local population as well as international visitors. The complex program is to include a hotel, retail, office space, entertainment, and cultural facilities. The site is over four acres in size and is to include 70,000 square meters of space. It will be adjacent to the Addis Ababa Museum.

Many of the amenities will be located in a podium at the base. Individual towers will rise from the base to house the office, hotel, and cultural functions. The tower facades will be rounded and organic in form. The name 'Addis Ababa' means 'new flower'. The significance of this name will be reflected in their physical shape. The curtain wall systems of the facades will include colored glass, to provide a shimmering and reflective effect in the African sunlight.



© MGM Mirage

CityCenter Opens for Business in Las Vegas

The MGM Mirage has completed the largest construction project in the United States. The 'CityCenter' development in Las Vegas, Nevada is a multi-use complex combining resort and urban developments within its 67-acre site. The US\$8.5 billion price tag will be challenging in these difficult economic times, even in Las Vegas.

The design contains a who's who of architectural names. Daniel Libeskind and David Rockwell designed the low-rise retail-entertainment center named 'Crystals'. Next door is the Aria, a 61-story hotel designed by Cesar Pelli. Other luxury hotel towers have

been designed by Murphy/Jahn, Foster and Partners, Rafael Vinoly, and Kohn Pedersen Fox. Artworks by Henry Moore, Frank Stella, and Claes Oldenburg occupy the outdoor plazas along with fountains.

Sustainability has been a high priority for the project. Libeskind's 'Crystals' achieved a LEED Gold rating. KPF's Mandarin Oriental hotel achieved a LEED Silver rating. To date, it is the largest retail district in the world to achieve a LEED rating from the US Green Building Council.



© David Wei

Mandarin Hotel to be Repaired in Beijing

In February of 2009, the 44-story Mandarin Oriental Hotel in Beijing was badly damaged in a fire. It started from a fireworks display to mark the end of the Lunar New Year. The Mandarin was within weeks of opening for business when the fire erupted. The adjacent China Central Television building was not damaged. Work has continued on the CCTV while the hotel has remained dormant.

An investigation and study have delayed repair work to the hotel. The CCTV building is continuing with fit-outs and is expected to be completed in 2010. The hotel work has been on hold, with scaffolding in place. ↗

Case Study: The Standard Hotel, New York

Authors

Todd Schliemann, Tara Leibenhaut-Tyre, Megan Miller, of *Polshek Partnership, LLP* and **Mark Plechaty, Erik Madsen, Craig D. Tracy** of *DeSimone Consulting Engineers*

Polshek Partnership Architects creates buildings whose designs authentically express the progressive missions of cultural, academic and scientific institutions and demonstrate technical and artistic excellence. The studio's projects significantly contribute both to the cultural life of their communities and to the enhancement of their contexts. In addition to The Standard, New York, award-winning projects include the Rose Center for Earth and Space, William J. Clinton Presidential Center, Carnegie Hall Renovation and Expansion, Newseum, University of Michigan Biomedical Science Research Building, WGBH Public Broadcasting Headquarters. The 150-person studio is located in New York City.

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DeSimone Consulting Engineers provides high-quality, creative structural engineering services to architects, owners and developers. Founded in New York City in 1969, DeSimone has offices located in New York, Miami, San Francisco, New Haven, Las Vegas, Hong Kong, Shanghai and Abu Dhabi. The company has provided design services for many of the most renowned structures in New York, including the Standard Hotel, HL 23, IAC headquarters and 100 11th, all located along the historic High Line. To date, DeSimone has designed projects in 40 states and 18 countries. Recently, the firm was listed on ENR's Top 500 Design Firms.

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...re-cladding

“It might sometimes be excused by the need for insulation as much as fashion chasing, but it’s still strange for so many buildings to be so heavily altered.”

Opinion Piece by Owen Hatherley against the re-cladding of many European Post-War buildings. From ‘Helpless tower are being buried alive, Building Design, September 10, 2009, p 9

"The building is a destination, both visually and experientially, realizing the client's conceptual goal to create a "living room for the neighborhood," a public place where hotel guests and pedestrians can co-mingle in a variety of spaces."

Designed by Todd Schliemann of Polshek Partnership Architects, The Standard, New York, is a new 204,500 square feet, 337-room hotel located in Manhattan's Meatpacking District, a vibrant neighborhood west of Greenwich Village on the City's Hudson River edge. The eighteen-story, concrete and glass structure defines the identity of the hotel and engages its urban context through contrast. The building straddles the High Line, an abandoned section of a 75-year-old elevated railroad line, which passes over the buildings of the district and is currently being developed as a new linear public park. The first section opened in June 2009.

Design Concept

Muscular, sculptural piers, whose forms clearly separate the building from the orthogonal street grid, raise the building 75 feet, allowing the horizontally-scaled industrial landscape to pass beneath it and natural light to penetrate to the street. The two slabs are "hinged" to further emphasize the building's distinction from the city's grid and its levitation above the neighborhood. The low-scale environment affords the building unusual visibility from all directions and unobstructed 360° views of the city from the building (see Figure 1).

The juxtaposition of the building's two primary exposed materials—poured-in-place, board-formed concrete and glass—reflects the character of New York City: the gritty quality of the concrete contrasts with the refinement of the glass. The concrete grid provides a delicate frame for the exceedingly transparent water-white glass, the two materials unified in the continuous plane of the curtain wall. This exterior wall breaks with the traditional architecture of hotels and in effect defines a new paradigm, replacing opacity with transparency, privacy with openness.



Figure 1. Design Collage © Polshek Partnership Architects

The hotel includes 337 guest rooms; a bar, restaurant and outdoor public plazas served by the hotel at the ground level; divisible banquet space on the third floor; health spa on the seventeenth floor; two clubs on the eighteenth floor; and an extensive roof deck.

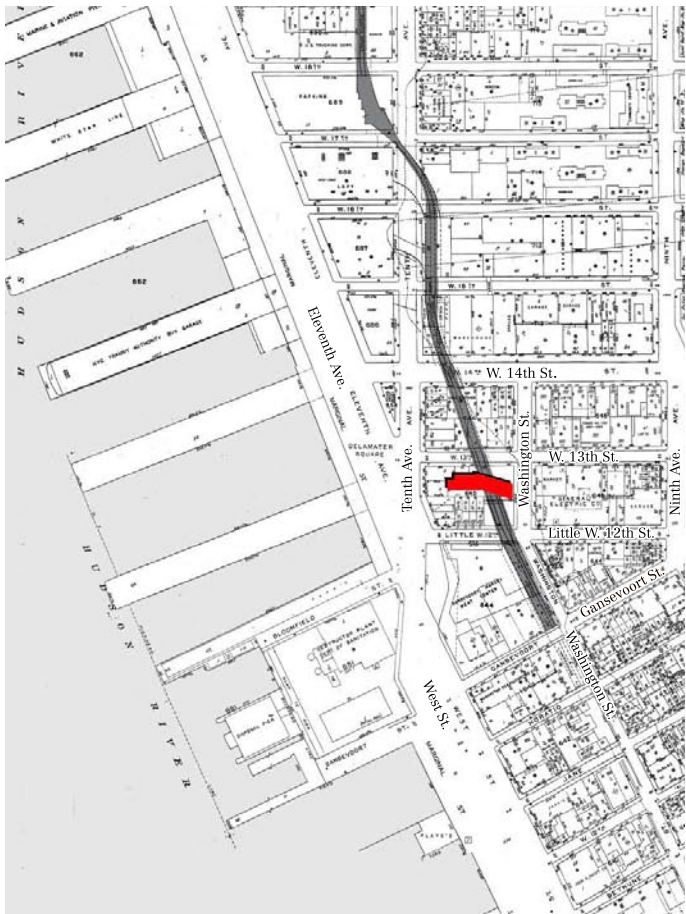


Figure 2. Site Map © Polshek Partnership Architects

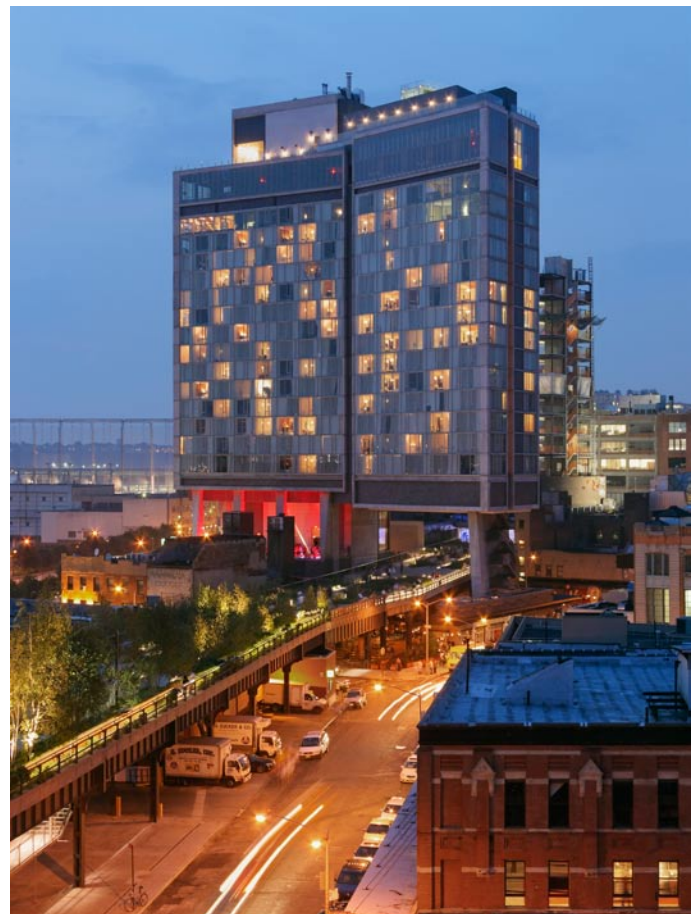


Figure 3. View from the South © Jeff Goldberg / ESTO for Polshek Partnership Architects

Urban Context

The Standard is located along Washington Street between West 13th Street and Little West 12th Street in the heart of the Meatpacking District, just north of the main entry to the High Line park at Gansevoort Street. Both the neighborhood and the High Line have seen significant changes over the years (see Figure 2).

The park is the transformation of an abandoned rail bed constructed in the early 1930s to isolate freight traffic from the street level. It meanders north from Gansevoort Street to West 34th Street, defining its own path as it cuts through and above the New York City Grid. In 1950, interstate trucking began to replace rail transportation, and in 1980, the last train ran on the High Line tracks.

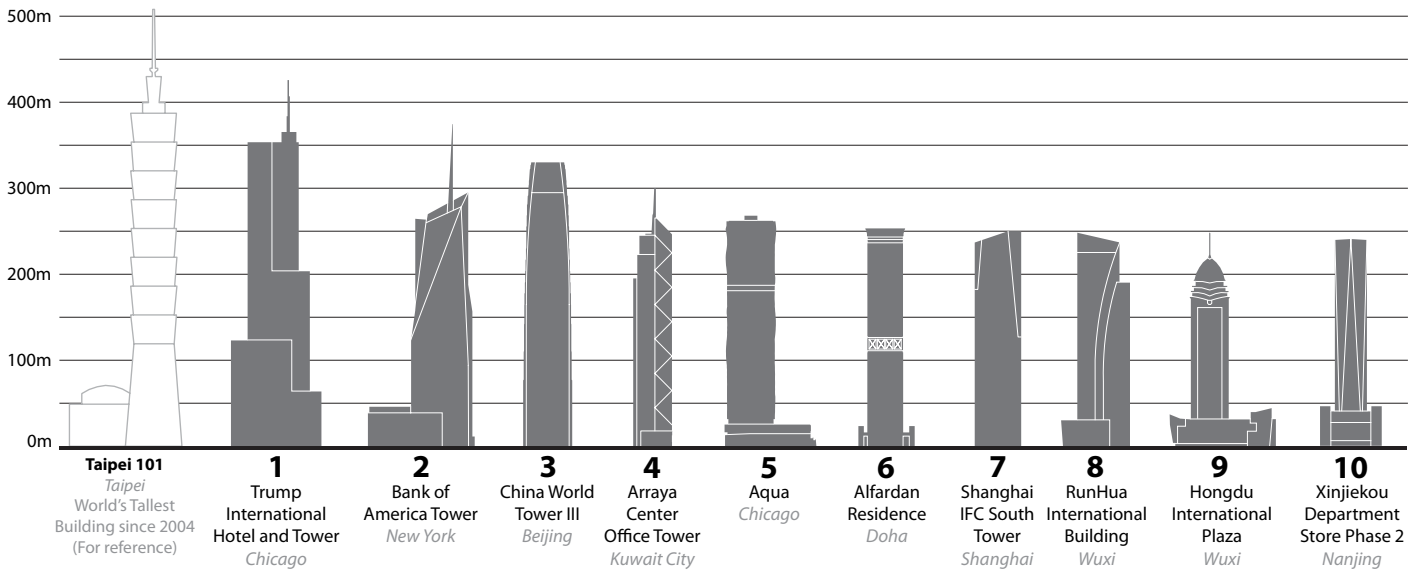
Until the late 1990s, the neighborhoods along the High Line were neglected and used primarily for industry and storage warehouses.

Two-story 19th- and 20th-century industrial buildings and manufacturing lofts constitute the District, which currently supports a range of uses from meatpacking to high-end retail and restaurants. The completion of the first section of the High Line park has had a major impact on the current growth and activity in the area. An Open Ideas competition in 2003 introduced the idea of reclaiming the High Line; as the planning proceeded, neighborhoods along its length have seen significant residential and commercial development. The Standard, New York anchors activity near the southern terminus of the park (see Figure 3).





Zoning and Structural Constraints

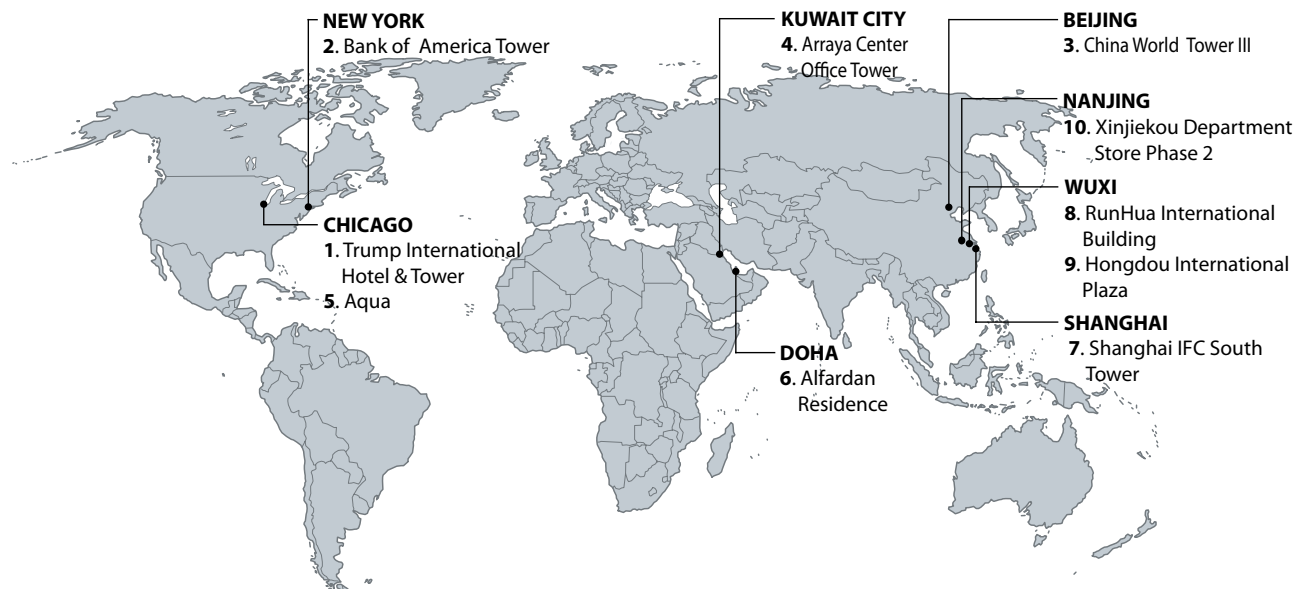
The timing of construction and the regulations governing building over and under the High Line proved challenging. Careful negotiations with the New York City Economic Development Council (NYCEDC) were required to arrive at and confirm specific easements around the Highline for future maintenance as well as to allow the unlikely possibility that trains might run there again. The NYCEDC maintained the 30 foot easement above the High Line held by previous railway owner CSX Transportation Inc., the rail company that donated the High Line south of 30th Street to the City in 2005. Other easements were not fully established until building construction was underway: all non-demountable construction needed to be three feet from

The 10 Tallest Buildings Completed in 2009



Building Name/Location	Height (m/ft)	Floors
 <p>1. Trump International Hotel and Tower Chicago, USA</p> <p>Developer: Trump Organization Architect: Skidmore, Owings & Merrill LLP Structural: Skidmore, Owings & Merrill LLP MEP: WMA Consulting Engineers Contractor: Bovis Lend Lease Photo: Marshall Gerometta / CTBUH</p>	423 / 1389	98
 <p>2. Bank of America Tower New York, USA</p> <p>Developer: Durst Organization / Bank of America Architect: Cook + Fox Architects Structural: Severud Associates MEP: Jaros, Baum & Bolles Contractor: Tishman Construction Corporation Photo: Marshall Gerometta / CTBUH</p>	365 / 1198	54
 <p>3. China World Trade Center Beijing, China</p> <p>Developer: China World Trade Center Co. Ltd Architect: Skidmore, Owings & Merrill LLP Structural: Arup MEP: Parsons Brinckerhoff Asia Co. Ltd. Contractor: Photo: Skidmore, Owings & Merrill LLP</p>	330 / 1083	74
 <p>4. Arraya Center Office Tower Kuwait City, Kuwait</p> <p>Developer: Salhia Real Estate Co. Architect: Fentress Architects Structural: Pan Arab Consulting Engineers MEP: Pan Arab Consulting Engineers Contractor: Ahmadiyah Contracting & Trading Co. Photo: Pawel Sullima</p>	300 / 984	60
 <p>5. Aqua Chicago, USA</p> <p>Developer: Magellan Development Group Architect: Studio Gang Structural: Magnusson Klemencic Associates MEP: Advance Mechanical Systems, Inc Contractor: James McHugh Construction Company Photo: Steve Hall © Hendrich Blessing</p>	262 / 858	87

	6. Alfardan Residence Developer: Al Fardan Real Estate Company Architect: Arab Engineering Bureau Structural: Hyder Consulting MEP: Shaker Consulting Group Contractor: Construction Development Company Photo: Hyder Consulting Middle East Limited	Doha, Qatar	253 / 830	64	Use: Residential Structural Material: Concrete CTBUH World's Tallest Building Ranking: 119
	7. Shanghai IFC South Tower Developer: Sun Hung Kai Properties (SHKP) Architect: Pelli Clarke Pelli Architects Structural: Aecom Structural Consultants Ltd. MEP: Parsons Brinckerhoff Asia Co. Ltd. Contractor: Shanghai Construction (Group) General Co., Ltd Photo: Sun Hung Kai Properties	Shanghai, China	250 / 820	58	Use: Office / Hotel Structural Material: Composite CTBUH World's Tallest Building Ranking: 128
	8. RunHua International Building Developer: Wuxi Rundili Construction & Development Group Architect: East China Architectural Design & Research Institute Co., Ltd. Structural: East China Architectural Design & Research Institute Co., Ltd. MEP: East China Architectural Design & Research Institute Co., Ltd. Contractor: Nan Tong Construction General Contractor Co., Ltd.	Wuxi, China	248 / 814	55	Use: Office / Hotel / Residential Structural Material: Concrete CTBUH World's Tallest Building Ranking: 137
	9. Hongdou International Plaza Developer: Wuxi Hongdu Development Group Architect: C.Y. Lee & Partners Architects/Planners Structural: East China Architectural Design & Research Institute Co., Ltd. MEP: East China Architectural Design & Research Institute Co., Ltd. Contractor: Shanghai No.4 Construction Co., Ltd.	Wuxi, China	248 / 814	45	Use: Office / Residential Structural Material: Concrete CTBUH World's Tallest Building Ranking: 138
	10. Xinjiekou Department Store Phase 2 Developer: Nanjing Xinjiekou Department Store Co., Ltd. Architect: Frederic Rolland International Structural: Nanjing Architectural Design & Research Institute Co., Ltd. MEP: Nanjing Architectural Design & Research Institute Co., Ltd. Contractor: Nanjing Dadi Construction (Group) Co., Ltd	Nanjing, China	240 / 787	60	Use: Office Structural Material: Composite CTBUH World's Tallest Building Ranking: 176



The 10 Tallest Building Completed in 2009 was compiled as per CTBUH Criteria for Defining and Measuring Tall Buildings. For more information on CTBUH height criteria please see <http://criteria.ctbuh.org>

About the Council

The Council on Tall Buildings and Urban Habitat, based at the Illinois Institute of Technology in Chicago, is an international not-for-profit organization supported by architecture, engineering, planning, development and construction professionals. Founded in 1969, the Council's mission is to disseminate multi-disciplinary information on tall buildings and sustainable urban environments, to maximize the international interaction of professionals involved in creating the built environment, and to make the latest knowledge available to professionals in a useful form.

The CTBUH disseminates its findings, and facilitates business exchange, through: the publication of books, monographs, proceedings and reports; the organization of world congresses, international, regional and specialty conferences and workshops; the maintaining of an extensive website and tall building databases of built, under construction and proposed buildings; the distribution of a monthly international tall building e-newsletter; the maintaining of an international resource center; the bestowing of annual awards for design and construction excellence and individual lifetime achievement; the management of special task forces / working groups; the hosting of technical forums; and the publication of the CTBUH Journal, a professional journal containing refereed papers written by researchers, scholars and practicing professionals. The Council actively undertakes research into relevant fields in conjunction with its members and industrial partners, and has in place an international 'Country Representative' network, with regional CTBUH representatives promoting the mission of the Council across the globe.

The Council is the arbiter of the criteria upon which tall building height is measured, and thus the title of 'The World's Tallest Building' determined. CTBUH is the world's leading body dedicated to the field of tall buildings and urban habitat and the recognized international source for information in these fields.

Council on Tall Buildings and Urban Habitat



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