



Best Tall Buildings 2010



CTBUH
International
Award Winning
Projects



Edited by
Antony Wood





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We would also like to thank our 2010 Awards Committee members for volunteering their time and efforts in deliberating this year's winners.

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Burj Khalifa

Dubai, UAE

Burj Khalifa has redefined what is possible in the design and engineering of supertall buildings. By combining cutting-edge technologies and cultural influences, the building serves as a global icon that is both a model for future urban centers and speaks to the global movement towards compact, livable urban areas. The Tower and its surrounding neighborhood are more centralized than any other new development in Dubai. At the center of a new downtown neighborhood, Burj Khalifa's mixed-use program focuses the area's development density and provides direct connections to mass transit systems.

Burj Khalifa's architecture has embodied references to Islamic architecture and yet reflects the modern global community it is designed to serve. The building's Y-shaped plan provides the maximum amount of perimeter for windows in living spaces without developing internal unusable area. As the tapering tower rises, setbacks occur at the ends of each "wing" in an upward spiraling pattern that decreases the mass of the tower as the height increases. These setbacks were modeled in the wind tunnel to minimize wind forces. The design of the Tower was significantly

influenced by its performance with respect to the wind, in both its shaping and orientation. The building went through many wind tunnel tests and design iterations to develop optimum performance.

The exterior cladding, comprised of aluminum and textured stainless steel spandrel panels, was designed to withstand Dubai's extreme temperatures during the summer months by using a low-E glass to provide enhanced thermal insulation. Vertical polished stainless steel fins were added to accentuate Burj Khalifa's height and slenderness.

The unprecedented height of the Burj Khalifa required it to be an innovative building in many ways. Design techniques, building systems, and construction practices all required rethinking, and in many cases new applications, to create a practical and efficient building.

The structural system, termed a "buttressed core," is designed to efficiently support a supertall building utilizing a strong central core, buttressed by its three wings. The vertical structure is tied together at the mechanical floors through outrigger walls in order to maximize the building's stiffness. The result is an efficient system where all of the building's vertical structure is used to support both gravity and lateral loads.

The Tower incorporates numerous enhancements to the fire and life safety systems, including "lifeboat" operation for elevators which allows for them to be

Completion Date: January 2010
Height to Architectural Top¹: 828m (2,717ft)
Stories¹: 163
Area: 302,586 sq m (3,257,009 sq ft)
Primary Use¹: Mixed: Office/Residential/Hotel
Owner/Developer: Emaar Properties PJSC
Design Architect: Skidmore, Owings & Merrill LLP
Associate Architect: Hyder Consulting
Structural Engineer: Skidmore, Owings & Merrill LLP
MEP Engineer: Skidmore, Owings & Merrill LLP
Main Contractor: Samsung; Besix Group; Arabtec
Other Consultants: Turner International; Lerch Bates & Associates; RWDI, Inc; The Boundary Layer Wind Tunnel Laboratory; STS Consultants; The RJA Group, Inc; SWA Group

¹For all definitions used in the data sections throughout this book, refer to CTBUH criteria shown on pages 184–187

Opposite: Context view within Downtown Dubai area with The Old Town in the foreground and Sheikh Zayed Road in the background.

A tall skyscraper (Burj Khalifa) in Dubai, UAE, with a cityscape in the background. The building is the central focus, reaching towards the top of the frame. The city below is densely packed with various buildings, and a body of water is visible in the lower left. The sky is a clear, light blue.

“This project has redefined a region
and a people, created a sense of
place for Dubai, advanced the
technologies of supertall buildings
and established a new benchmark
for the integrated practice of
architecture and engineering.”

*Gordon Gill, Awards Chair, Adrian Smith + Gordon
Gill Architecture*



Left: North west building wing accommodating the Armani Hotel amenities

Opposite Top: Project site plan

Opposite Bottom Left: Upper level of the Corporate Suites lobby

Opposite Bottom Right: "World Voices" sculpture in the residential lobby

“Towering over Dubai’s skyline, the design creates a global icon for 21st century architecture and engineering that will be studied for years to come.”

Bruce Kuwabara, Juror, KPMB Architects

used for controlled evacuation under certain situations, decreasing total evacuation time by 45% over stairs alone.

Due to its height, the building is able to utilize ventilation where cooler air temperatures, reduced air density, and reduced relative humidity at the top of the building allow for “sky-sourced” fresh air. When air is drawn in at the top of the building, it requires less energy for air conditioning, ventilation, and dehumidification. The building’s height also generates a substantial stack effect due to the thermal differences between the buildings’ interior and exterior, but Burj Khalifa was designed to passively control these forces, reducing the need for mechanical means of pressurization.

Burj Khalifa has one of the largest condensate recovery systems in the world. Collecting water from air conditioning condensate discharge prevents it from entering the wastewater stream and reduces the need for municipal potable water.

The tower’s management systems utilize smart lighting and mechanical controls which lower operational costs, allow for a more efficient use of building resources and services and better control of internal comfort conditions. Individual electric energy monitoring systems enable energy optimization of the tower’s systems over its lifetime.

With over 185,800 sq m (2,000,000 sq ft) of interior space designed for Burj Khalifa, planning of the





Jury Statement

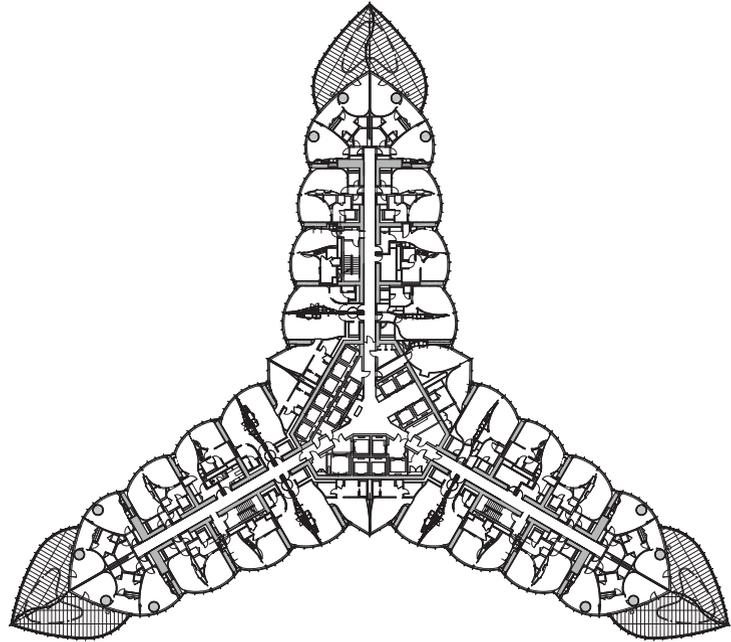
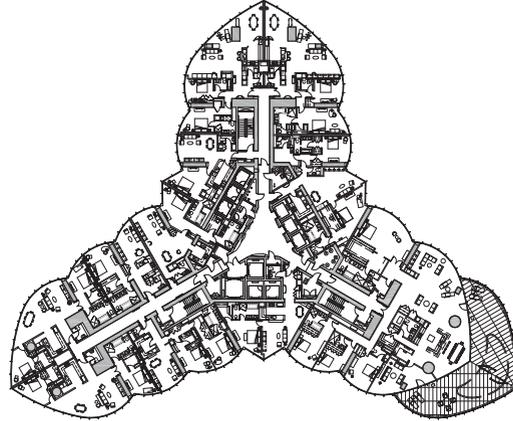
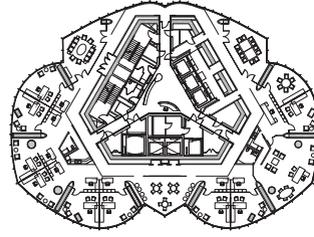
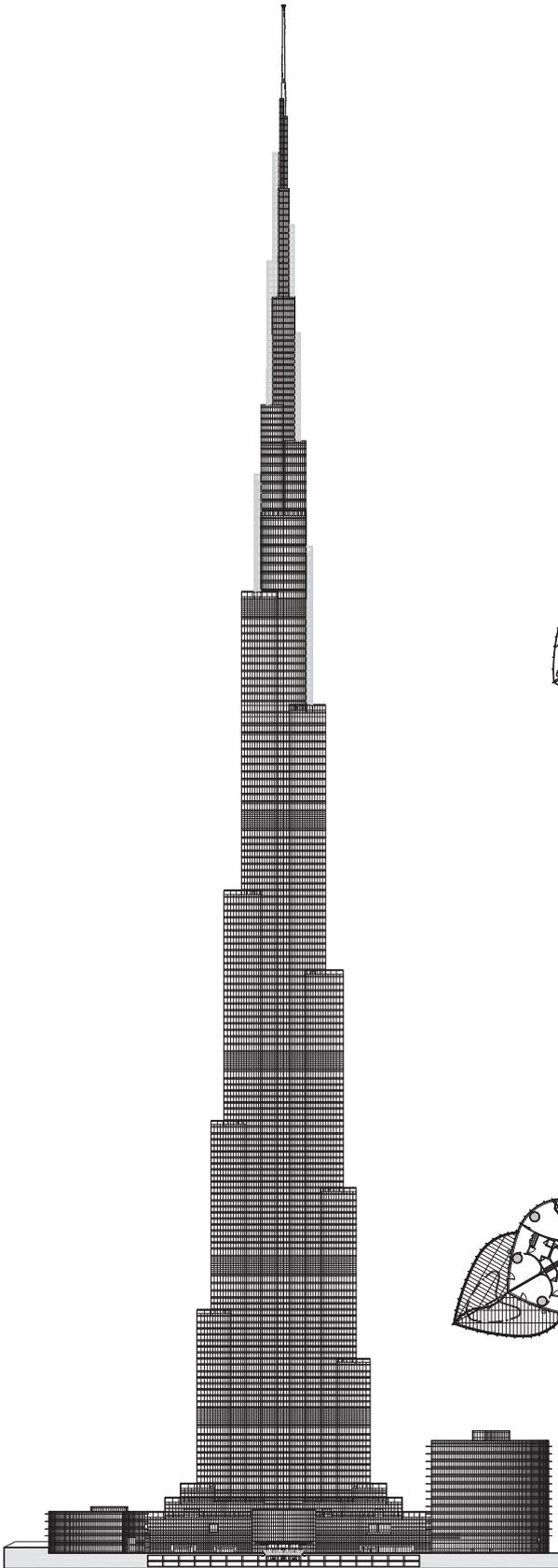
Undoubtedly one of the wonders of the modern world, Burj Khalifa is graceful and elegant as it reaches upward with seeming ease. The building's iconic status reflects the aspirations of Dubai to establish itself among the world's great cities. Through its ambition, style, and record-breaking height, it has instantly become one of the most recognizable buildings of our time.

The execution of this project was unprecedented in scale. Burj Khalifa utilized the latest technological advances in design, construction, and materials. It pushed the limits on the entire design and construction processes of high-rise buildings to a new level, emerging as a catalyst for a new surge of tall building systems and concepts all around the world. Carefully crafted around the wind forces, the Y-shaped plan and attenuated, stepped massing that bring the building to its pinnacle are at once beautiful and efficient.

building's interior space began at the earliest stages of its design focusing on three main goals—to recognize and acknowledge the building's height, to integrate its structural and architectural rationale, and to appreciate the locale's heritage, history and culture. The interiors of the uppermost floors were designed to reflect celestial influences. This is in contrast to the lower floors, which are inspired by natural elements.

An art program for the Tower was developed in which over 500 individual pieces of art were placed and specified throughout the Tower. The premier featured art piece resides in the tower's residential lobby. This sculpture, completed by the internationally renowned artist Jaume Plensa, is entitled "World Voices" and is composed of 196 cymbals supported by stainless steel rods rising from two pools similar to reeds in a lake. The cymbals represent the 196 countries of the world and reflect that the Burj Khalifa was a result of a collaboration of many people from around the world.

Left: Night view from the south east with the Dubai Fountain in foreground
Opposite Left: Elevation
Opposite Right: From top to bottom: typical office, typical residential and typical hotel floor plans



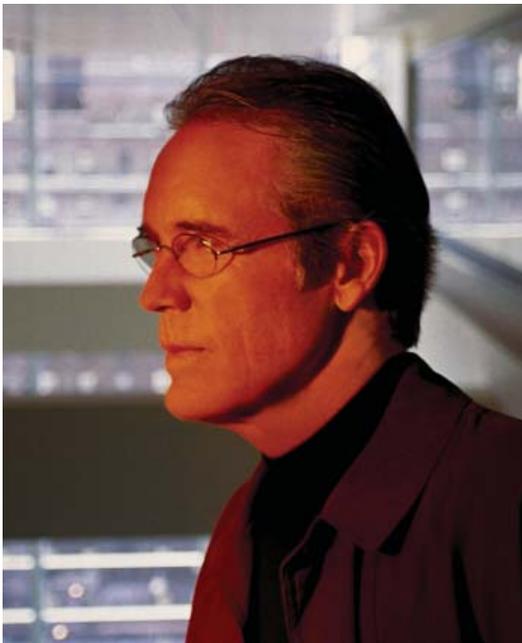
Lifetime Achievement Lynn S. Beedle Award

William Pedersen

Kohn Pedersen Fox Associates

Since the beginning of his career, William Pedersen's approach to design has been one that weds formal and technical originality with a modesty informed by a deep respect for spatial and historical context. The ability to solve design challenges in ways that contribute to, but do not depart from, the urbanism from which they are born is rare amongst architects, and perhaps even rarer amongst those working on tall buildings. This is not to say that Mr. Pedersen's approach is one limited to the sources of tradition and convention. On the contrary, he has shown remarkable ability in thoroughly understanding context, helping it to speak in new ways and to new audiences.

Mr. Pedersen's design philosophy embraces the relationship between internal and external elements,



focusing on the connection of the building and its surrounding community. His work evokes response by drawing together the past and the present, striving to embody both memory and invention.

In projects ranging from small residential buildings to supertall towers, Mr. Pedersen demonstrates the power that buildings have to affect the communities in which they reside, and their ability to influence the lives of those who live and work within them. This endows the architect with great responsibility.

After getting his Master of Architecture degree from MIT in 1963, Mr. Pedersen worked as a designer with Pietro Belluschi in 1963 and with Eduardo Catalano from 1964 to 1965. He studied at the American Academy in Rome as a recipient of the Rome Prize in Architecture in 1965, and was an associate with I.M. Pei and Partners from 1967 to 1971, after which he became Vice President of John Carl Warnecke and Associates for five years. In 1976, he co-founded Kohn Pedersen Fox Associates with A. Eugene Kohn and Sheldon Fox.

Mr. Pedersen's first project, 333 Wacker Drive (1983) in Chicago, remains one of the city's most celebrated buildings, demonstrating that the best way to truly respect site context is to take full advantage of its unique character and to allow it to inform the entire design process. At a site where urban grid meets curved river, the context suggests a design that addresses two distinct sides. According to *The Chicago*

Opposite: International Commerce Centre, Hong Kong, China, (2010). Recognized by the CTBUH as the fourth tallest building in the world at the time of its completion – 484m (1,588ft)



“Pedersen’s ability to scale his towers into a city’s fabric demonstrates an uncommon concern for urban habitat.”

Bruce Kuwabara, Juror, KPMB Architects



Left: 333 Wacker Drive, Chicago, USA (1983)
Right: DG Bank Headquarters, Frankfurt, Germany (1993)
Opposite: One of Pedersen's concept sketches for the Shanghai World Financial Center

Tribune's Blair Kamin, "333 Wacker Drive adapts to the city's essence. The curving green glass office building that gracefully marks a bend in the Chicago River made stars of its New York City architects and helped introduce postmodernism to Chicago."

Similarly, Mr. Pedersen's design for the DG Bank Headquarters (1993) in Frankfurt, Germany, responds to the complexities of the site with one side facing a low-rise residential district and the other facing the CBD. The tower's central spine anchors the building on the Frankfurt skyline while formal divisions and fractures correspond to neighboring towers. Its narrowest dimension faces the residential neighborhood and opens up office views to the city, with massing scaled

to connect to the low-rise residential neighborhood. The Shanghai World Financial Center (2008) has been heralded as a symbol of commerce and culture that speaks to the emergence of Shanghai as a global city, and was the CTBUH's recipient of the Best Tall Building "Overall" Award in 2008. At a height of 492m (1,614ft) it was recognized by the CTBUH as the second tallest building in the world at the time of its completion. To date it still holds the title of the world's highest observation deck, which at 474m (1,555ft) is 22m (72ft) higher than the observatory at the Burj Khalifa. The Shanghai World Financial Center's design is that of a square prism intersected by two cosmic arcs—ancient Chinese symbols representing the heavens and the earth. The interaction between these

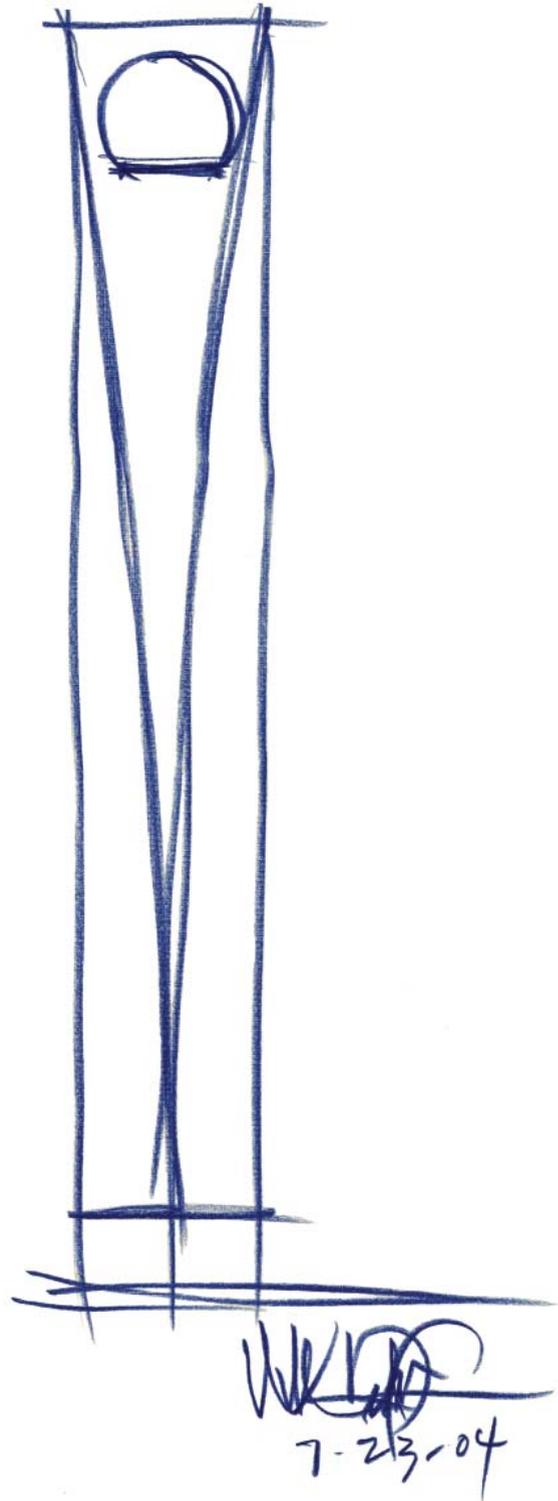
two realms gives rise to the building's form, which features a sky portal carved out of the top of the tower, lending balance to the structure and linking the two opposing elements.

Pedersen's recently completed International Commerce Centre (2010), located in Hong Kong, became the world's fourth tallest building at the time of its completion at a height of 484m (1,588ft). Poised at the tip of Victoria Harbor, the tower's subtly tapered re-entrant corners and the gently sloped curves at its base are designed to optimize its structural performance. These curves splay out at the base of the tower, rooting the tower in its surroundings, while creating sheltering canopies on three sides, and a dramatic atrium on the north side. The atrium gestures towards the rest of the Union Square development and serves as a public connection space for retail and rail station functions. *(Note: This project was not submitted for consideration for a CTBUH 2010 Award and thus does not feature in this book. It is expected that this building will be submitted for consideration for the CTBUH 2011 Awards program.)*

Jury Statement

For his achievements in architecture and the establishment of one of the world's most celebrated firms, Bill Pedersen is one of our most significant practitioners in the field of architecture today. For the last 34 years, under his design leadership, KPF has contributed to the advancement and innovation of architecture through its global practice. His contribution to the design of tall buildings is embodied in the consistent quality and sheer excellence of his vast portfolio of significant urban towers. His influence is immense and ubiquitous.

Mr. Pedersen's philosophy on tall building design and deep interest in natural form have created everlasting images that have changed and influenced the skylines of most major cities around the globe. He designs intuitively—not by computer calculations—but by carving out forms from damp clay in the age old methods of the grand masters.





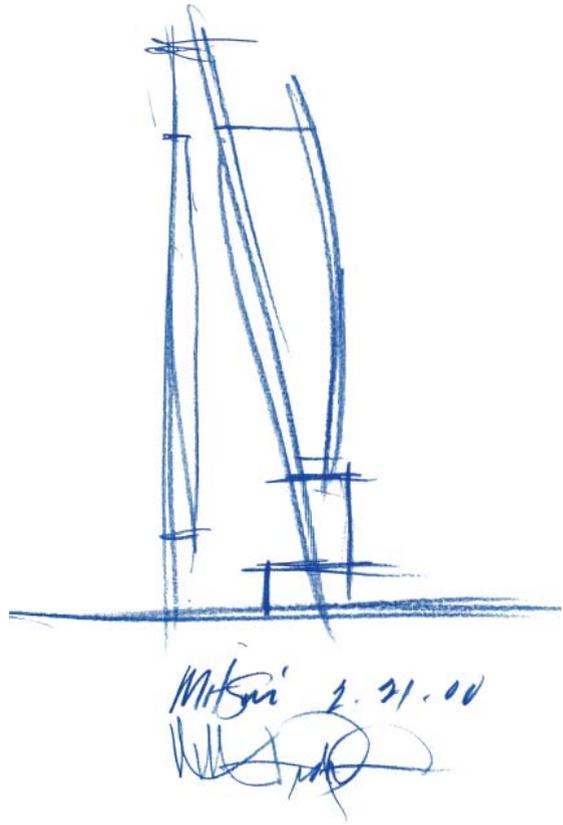
Left: Shanghai World Financial Center, Shanghai, China (2008)
Opposite Top Left: Posteel Tower, Seoul, South Korea (2002)
Opposite Top Right: One of Pedersen's concept sketches for the Posteel Tower
Opposite Bottom Left: First Hawaiian Bank Center, Honolulu, Hawaii (1995)
Opposite Bottom Right: 1250 Boulevard René-Lévesque, Montreal, Canada (1992)

“Mr. Pedersen derives most of his designs to reflect on the city’s culture, its contextual setting, and most importantly, he creates a dialogue with adjacent buildings.”

Ahmad Abdelrazaq, Juror, Samsung Corporation

Each building designed by Mr. Pedersen has its own personality yet all his buildings are dedicated to creating a dialogue with their surroundings. His designs exemplify the belief that the art of architecture and the art of urbanism are inseparable and that when a KPF structure is completed, the client has made a contribution not only to its own future, but the future of a city as well. According to Rafael Viñoly, “His contribution spans continents, from Asia to the Americas and Europe, not only as a designer and creator of urban form but also a leader and mentor ... I have known and admired him personally and professionally for over 20 years. Bill’s designs have transcended generations in time without appearing dated.”

For his achievements and contributions to the built environment, Mr. Pedersen has personally received six AIA National Chapter Honor Awards and numerous Merit, Design Excellence and Distinguished Architecture Awards from various AIA state and city chapters. He was awarded the Gold Medal for lifetime achievement in architecture from Tau Sigma Delta, the National Honor Society for Architecture and the Allied Arts, and the Arnold W. Brunner Memorial Prize in Architecture for Contributions in Architecture as an Art, awarded by the American Academy and the Institute of Arts and Letters. Mr. Pedersen lectures and has served on academic and professional juries and symposia throughout the world.





The Council on Tall Buildings and Urban Habitat (CTBUH) is the world's foremost authority on tall buildings. This book is the culmination of the annual awards process in which the CTBUH recognizes outstanding tall buildings from the past year. One winner is chosen from each of four geographical regions (Americas, Asia & Australasia, Europe, and Middle East & Africa) and a further award presents the title of Best Tall Building "Overall" to one of the four regional winners. Additionally the CTBUH awards two annual lifetime achievement awards to individuals who have made a significant contribution to the design or technical advancement of tall buildings.

The book provides an overview of the winning, finalist and nominee projects (and careers of the Lifetime Achievement winners). Winning and finalist projects are fully profiled with stunning images, as well as detailed drawings and plans, which accompany an in depth account of the buildings' architectural design, structural design, and any innovations in fields such as program or sustainability. The book also features the official current list of the "100 Tallest Buildings in the World" as the CTBUH is the internationally recognized official arbiter of tall building height.

Highlighting the best tall building construction from 2010, Best Tall Buildings seeks to represent those projects with the most innovative design and those which strive to advance the profile of the tall building as an integrated sustainable element in cities across the world. Fascinating and inspiring reading for all those interested in the planning, design and construction of tall buildings.



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