

CTBUH Journal

Tall buildings: design, construction and operation | 2009 Issue III

Trump International Tower & Hotel
A Humanist Approach To Tropical High-rise
Shaping the High-rise Framework
Non-orthogonal high-rise buildings
40 years of the CTBUH: Chairman Reflections
Tall Buildings and Embodied Energy
2009 Chicago Skyscraper Summer Tours



CTBUH 40th Anniversary
1969-2009

Towards a sustainable urban future

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Front cover: *Trump International Hotel & Tower, Chicago*
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Zak Kostura, Editor

In this issue, the Council jubilantly celebrates the opening of the 92-story Trump International Hotel and Tower in Chicago, USA. The structure was completed to great public fanfare on January 3, 2009, when a Sikorsky S-61 helicopter delivered the final steel supports for the building's 192-foot spire. Yet in a move then unprecedented in skyscraper development, the 339-room hotel celebrated its grand opening to the public a full 8 months prior to the spire's high-altitude helicopter delivery.

This move, carefully planned for throughout the conception and design of the building, proves the viability of partial occupancy in phased building construction. Modular fabrication and increasingly sophisticated construction techniques continue to enhance the potential for partial occupancy prior to substantial completion, providing a financial boon to developers and shareholders who eagerly await the opportunity to begin cashing in on their mammoth investment.

The successful implementation of partial occupancy at the Trump Tower is but one bit of evidence that innovation in the skyscraper typology is alive and well in the city that boasts its invention. On the northern edge of Millennium Park, one of Chicago's vital civic centers, two further additions to the city's celebrated skyline are helping to push the narrative of groundbreaking skyscraper design and construction.

The first, like the Trump Tower, opened its doors long before it reached its current height. The Blue Cross Blue Shield tower, completed to the 32nd floor in 1997, was designed and constructed with provisions allowing for a near-doubling of the tower's height to 57 stories at a later date. This impressive feat of phased construction – along with that of the Trump Tower – was reported on by Robert Lau in Issue 3 of the 2008 CTBUH Journal. The second phase of BCBS is due to be complete next year.

The second project, widely known as Aqua, is an undulating 82-story mixed-use residential skyscraper. Designed by Jeanne Gang and Studio Gang Architects, Aqua again implemented flexible, modular formwork to rapidly set out and cast each unique floor slab, minimizing the lead time associated with the novel and breathtaking form. Now substantially complete, this building was toured by the CTBUH late last year – an experience that was reported on in Issue 1 of the 2009 CTBUH Journal.

Selection of The Windy City as the venue for this year's CTBUH conference is well timed given these recent achievements in tall building design and construction. If you will be in attendance, I hope that this issue's case study of the Trump Tower, along with other relevant papers and pieces in past releases of the Journal serve as useful technical guides for your tour of the cityscape. These projects serve to underscore the importance of chronicling and sharing knowledge and experience so that future tall building projects worldwide can be informed by the impressive achievements of today's modern building stock.

On behalf of the Council, I hope to see you in Chicago in October.

Best Regards,

A handwritten signature in black ink, appearing to read 'Zak Kostura'. The signature is fluid and stylized, with a long horizontal stroke at the end.

Zak Kostura

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Case Study: Trump International Hotel & Tower



"Born of a place with a history of great buildings, the tower contributes to an exciting and ever-evolving architectural dialogue."

Chicago has been established for over 150 years, and its skyline is a testament to its rich architectural heritage. The Trump International Hotel & Tower is a prime example of this, as it blends modern design with the city's historic character. The building's location in the Loop, near the Chicago River, provides a unique setting for this new addition to the city's skyline.

The tower's design is a result of a collaborative effort between the architect and the client. The goal was to create a building that would stand out in the city's skyline while also respecting the surrounding context. The result is a tower that is both a landmark and a reflection of the city's history.

The building's construction was a complex process, involving many challenges. The site was a mix of old and new, and the tower's design had to be adapted to fit the site's unique conditions. The construction team worked hard to overcome these challenges, and the result is a tower that is a true masterpiece of modern architecture.



...remaking Paris

Chicago is often called the "Little Italy of the Midwest" because of its large Italian population. The city's architecture is a mix of styles, reflecting its diverse history. The tower's design is a blend of modern and traditional, creating a unique look that fits in with the city's architectural heritage.

The tower's construction was a complex process, involving many challenges. The site was a mix of old and new, and the tower's design had to be adapted to fit the site's unique conditions. The construction team worked hard to overcome these challenges, and the result is a tower that is a true masterpiece of modern architecture.

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Tall Buildings in Southeast Asia - A Humanist Approach to Tropical High-rise



"Much of the developing world is located around the equatorial belt, and it is vital that tropical design research addresses the important questions of how we can live well and sustainably with our climate and with the densities projected for the rapidly growing region."

The tropical climate in Southeast Asia presents unique challenges for tall building design. High humidity and high temperatures can make traditional building forms uncomfortable and inefficient. A humanist approach to design is needed to create buildings that are not only functional but also comfortable and sustainable in the tropical environment.

The research focuses on how to design tall buildings that take advantage of the tropical climate. This includes using natural ventilation, shading, and other passive design strategies to reduce the need for air conditioning. The goal is to create buildings that are both comfortable and sustainable in the tropical environment.



The research also explores how to design tall buildings that are socially and culturally appropriate for the region. This includes considering local building traditions and community needs. The goal is to create buildings that are not only functional and sustainable but also socially and culturally appropriate for the region.

The research findings provide valuable insights into how to design tall buildings in the tropical environment. These insights can be used to guide the design of future tall buildings in Southeast Asia and other tropical regions.

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Shaping the High-rise Framework: Tall Buildings Policies and Zoning



"Learning from the Netherlands: Ask not what the city can do for the tall building; ask what the tall building can do for the city."

The Netherlands has a long history of tall buildings, and its experience provides valuable lessons for other cities. The Dutch have developed a framework of policies and zoning that has allowed them to build tall buildings in a way that is both functional and socially beneficial.

The research explores how other cities can learn from the Dutch experience. This includes looking at the Dutch approach to zoning, building codes, and public space. The goal is to identify the key elements of the Dutch framework that can be adapted to other cities.



The research also explores how to design tall buildings that are socially and culturally appropriate for the region. This includes considering local building traditions and community needs. The goal is to create buildings that are not only functional and sustainable but also socially and culturally appropriate for the region.

The research findings provide valuable insights into how to design tall buildings in the tropical environment. These insights can be used to guide the design of future tall buildings in Southeast Asia and other tropical regions.

“Lynn created the Council... and did so from nothing more than his own dreams and his own energies. He dragged us, sometimes kicking and screaming, to the far corners of the globe... thus providing a sort of technical transfer of information about tall buildings.”

Leslie E. Robertson, page 36



© Ingenhoven Architects

1 Bligh Starts Construction in Sydney

The commercial construction in downtown Sydney, Australia has been slow of late except for the corner of O'Connell, Bligh, and Bent streets. The foundation has been poured for a new 27-story office building with the anchor tenant as Clayton Utz, a law firm. Dexus and Cbus Property own the site and Architectus and Ingenhoven Architects designed the

tower. The contractor is Grocon with completion scheduled for 2011.

The 42,700 sq m tower's sustainable design includes a double-skin façade, water recycling, solar power and an indoor/outdoor atrium. With a slowdown in commercial construction within Sydney's CBD, this project is a welcome addition. 1 Bligh should lead in a new direction of sustainable development for Sydney and Australia.



© Benjamin Brink/The Oregonian

Twelve West Building installs Wind Turbines

A wind turbine on the top of a building is rare in America. The latest installation is on top of the Twelve West Building in Portland, Oregon. Zimmer Gunsul Frasca Architects and Gerding Edlen Development Co. have installed four Skystream turbines, manufactured by Southwest Windpower Inc., on to the top of the 22-story multi-use building. Besides an energy efficient building, the designers are aiming for a LEED Platinum certification with the energy generation. The project will include residential, retail and office spaces with a rooftop garden.

Despite providing only 1% of the building's electricity needs, the turbines' data will provide information for future installations.

Building-mounted turbines are smaller than rural wind farm turbines. While critics have said that the money would be better spent on more efficient wind farms, notably along the Columbia River, this project will become an urban experiment in wind technology. Another issue is the noise from the blades, which is a concern in a city environment. The sound produced from the Twelve West turbines are anticipated to be similar to an electric fan.

Several developers have previously proposed wind turbines for Portland. While there are several reasons why it has not taken place, the Twelve West project will provide the data and expertise for future wind turbine installations.



© Rogers Stirk Harbour and Partners

BBVA headquarters in Mexico City

The design for a new headquarters for BBVA Bancomer will be by Rogers Stirk Harbour and Partners with Legorreta + Legorreta. It will be located at the meeting of Paseo de la Reforma and Chapultepec Park in Mexico City. Standing 50 stories high with 6 underground levels, the concrete and steel structure will contain 78,600 sq m of office space. Its plan is triangular and it will contain references to Mexico's architectural heritage.

...wind turbines

“It's just a gesture, and it's fine if people want to make that gesture ... To me, there's a lot of ways to play the game. But the real game is to design a super-efficient, comfortable, healthy building.”

Jerry Yudelson, a Tucson, Arizona, green building consultant on the installation of four wind turbines on the roof of the new Twelve West Building in downtown Portland. From 'Innovative wind turbines to top new downtown Portland high-rise' The Oregonian, August 13, 2009

The design will achieve a LEED Gold certification. Some of these elements will include distinctive façade shading to control solar gain, vertical gardens at several levels, and open 'village' areas. In a sense this tower is a rethinking of a traditional office tower. Instead of the repetition of the same floorplan stacked vertically, these 'village' areas are for informal socializing, to form vertical communities within the tower. The vertical gardens will compliment these 'villages'. Completion is scheduled for 2013.



© Wikimedia

Cape Town Plans High-Rise Communities

With a backlog of thousands of housing units and little space to put them, the city of Cape Town, South Africa is planning entire high-rise communities. The backlog can be up to 20,000 units per year, with only 10,000 units being produced annually. Housing officials have stated that the backlog is around 400,000 units.

Cape Town housing officials are hoping to reverse this situation by building dense high-rises in cluster 'towns', which will be grouped around amenities. Each 'town' will have access to stores, community centers, schools, and recreation facilities. The intent is to produce communities instead of just house

units. It has been shown in other cities around the world that thousands of residential units can be made but they will not be successful without adequate access to amenities. Scaling the size of the 'towns' to Cape Town's standards is also a factor. The high-rises will be around 14 stories tall with about 5,000 residential units per clustered 'town'. Clusters larger than these have been deemed unmanageable.

With limited available land, infrastructure and resources (including funding), the housing officials consider this the most economical and workable option for the current situation.



© Courtesy of the Office for Metropolitan Architecture

MahaNakhon tower in Bangkok

A new 1,600,000 sqft multi-use complex is planned for Bangkok, Thailand. It is designed by Ole Scheeren of The Office of Metropolitan Architecture and will include 200 apartments, 150 hotel rooms and commercial space. At 77 stories, the tower will become the tallest structure in Bangkok. A public plaza at the base of the tower will connect the complex to the streetscape.

The distinguishing feature of the tower design is the terraces that spiral up the facades. These terraces, some with balconies, will include vegetation that will grow in the tropical climate. The glass curtain wall will be flush in some areas and integrated in other areas to

the terraces. In many units the residents will have the opportunity to open their living spaces to the exterior, thereby increasing the livable area.

The base of the tower will provide amenities, such as cafes and restaurants. These will be placed in a public square between the tower and another structure called the 'Cube'. Adding these facilities to the residential project will create a sense of urban space for all of Bangkok. The anticipated completion date is 2012.



© Antony Wood / CTBUH

India eases airport height restrictions

The Civil Aviation Ministry and the Airport Authority of India have eased height restrictions around airport runways, almost doubling the allowable height limit. Cities like Kerala and Gurgaon may benefit the most from this change in government policy. There are only a few established high-rise cities in India, like Mumbai, Cochin, Thiruvalla, and Kottayam.

As in many developing countries, urban planning in India has been haphazard in the past. The high population densities in the urban centers could use better planning for their structures. The new height allowances, ↗

Case Study: Trump International Hotel & Tower



William F. Baker



Paul James



Richard F. Tomlinson



Andrew Weiss

Authors

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William F. Baker is the Structural and Civil Engineering Partner for Skidmore, Owings & Merrill. Throughout his distinguished career, Bill has dedicated himself to structural innovation—most notably in the design of tall buildings within the urban landscape. In addition to working at SOM, Bill's expertise is frequently solicited by institutions of higher learning, as well as numerous professional organizations. Bill is the 2008 recipient of the Fazlur Rahman Khan medal from CTBUH and the 2009 recipient and first American to receive the Fritz Leonhardt Prize.

²**Paul James**, Senior Vice President, Bovis Lend Lease
Paul James, with over 37 years of construction expertise, has been an integral member of the Bovis Lend Lease Chicago office since 1989. Prior to coming to Bovis Lend Lease, Paul spent 17 years with James McHugh Construction Co. As Senior Vice President and Director of Technical Services, Paul manages a team of estimators, value engineers, and schedulers who provide design phase services including estimating and budget control, development of procurement criteria, schedules, and constructability and logistics planning.

¹**Richard F. Tomlinson II**, Partner, Skidmore, Owings & Merrill LLP
Richard F. Tomlinson is a managing partner of the SOM Chicago office. Under his leadership, SOM continues to design some of the world's largest, most complex and high-profile projects. Mr. Tomlinson manages professionals from various disciplines within the firm and oversees the progress of key projects. As the key liaison between SOM and clients, general contractors, construction teams and specialty consultants, he ensures that SOM meets client expectations.

³**Andrew Weiss**, Executive Vice President, The Trump Organization
In charge of all major development projects, Andrew Weiss has been managing the design and construction of real estate developments for The Trump Organization, for over 25 years, including all major Trump-affiliated developments since 1981. As Owner Representative/Project Director, Mr. Weiss leads through the development of the program, selection of the project team members, including architects, engineers, consultants and contractors to the preparation of construction documents and award of contracts.

^{1,2}For author contact information, company profile and project team please see page 22.

"Born of a place with a history of great tall buildings, the tower contributes to an exciting and ever-evolving architectural dialogue."

Chicago, a city known worldwide for its tall buildings, welcomed a new supertall tower to its skyline this year. Bookended by the 442-meter (1,450-foot) Sears Tower to the south and the 344-meter (1,128-foot) John Hancock Center to the north, the 415-meter (1,362-foot) Trump International Hotel and Tower is the tallest residential, and the largest concrete, building in the United States. It is also the tallest building project in North America since the completion of the Sears Tower in 1974, and one of the largest buildings to be partially open to the public while under construction. This last distinction, although not as glamorous as the rest, is one of the most innovative stories behind Trump Tower. It represents a feat of planning, mixed-use programming, and construction that required a remarkable degree of collaboration between the Trump Organization, architect Skidmore, Owings & Merrill LLP (SOM), construction manager Bovis Lend Lease, and the City of Chicago.

Collaboration Between Client, Architect, and City

Trump Tower rises from the heart of the city, at a point where the Chicago River curves gently to the southwest. Its 401 N. Wabash address is the former site of the low-rise Chicago Sun-Times building. When the Trump Organization purchased the land in 2001, they saw the waterfront as a natural location for a tall building that would offer 360-degree city and lake views and direct connections to the river (see Figure 1).

The Trump Organization initially envisioned a 150-story structure that would eclipse the height of the Sears Tower, but revised those plans after the terrorist attacks of September 11, 2001, when developers began to re-evaluate the perceived benefits, public perception, and marketability of supertall buildings. To maintain economic viability in the post-9/11 real estate market, the plans for Trump Tower would require continual adjustment – and readjustment – to trends that were difficult to anticipate.

Over the next two years, the tower was scaled back to a shorter office and residential building and then, when it became apparent that the

Chicago market had a greater need for centrally located residential and high-end hotel space, the plans were again revised and the project re-emerged as a slender, 92-story tower that would combine luxury condominiums with a world-class hotel, riverfront retail, and amenities. With the City of Chicago's input and support, the Trump Organization and SOM approached the project with the flexibility necessary to create a building that would thrive in the city, in both the near and long term.

Urban Planning

The project's centrally located site presented an opportunity to create active open space for the city, as well as a connective link between the Chicago Loop, North Michigan Avenue, and the riverfront. With the understanding that the tower could change the way in which people experienced the Chicago River, designers shaped the building to reflect its orientation along the water. The south side of the tower parallels the riverbank and, at its base, engages with a dynamic, three-level walkway that anchors the waterfront and enlivens it with restaurants and shopping. The tower's massing, lifted by 12 meters (39 feet) at

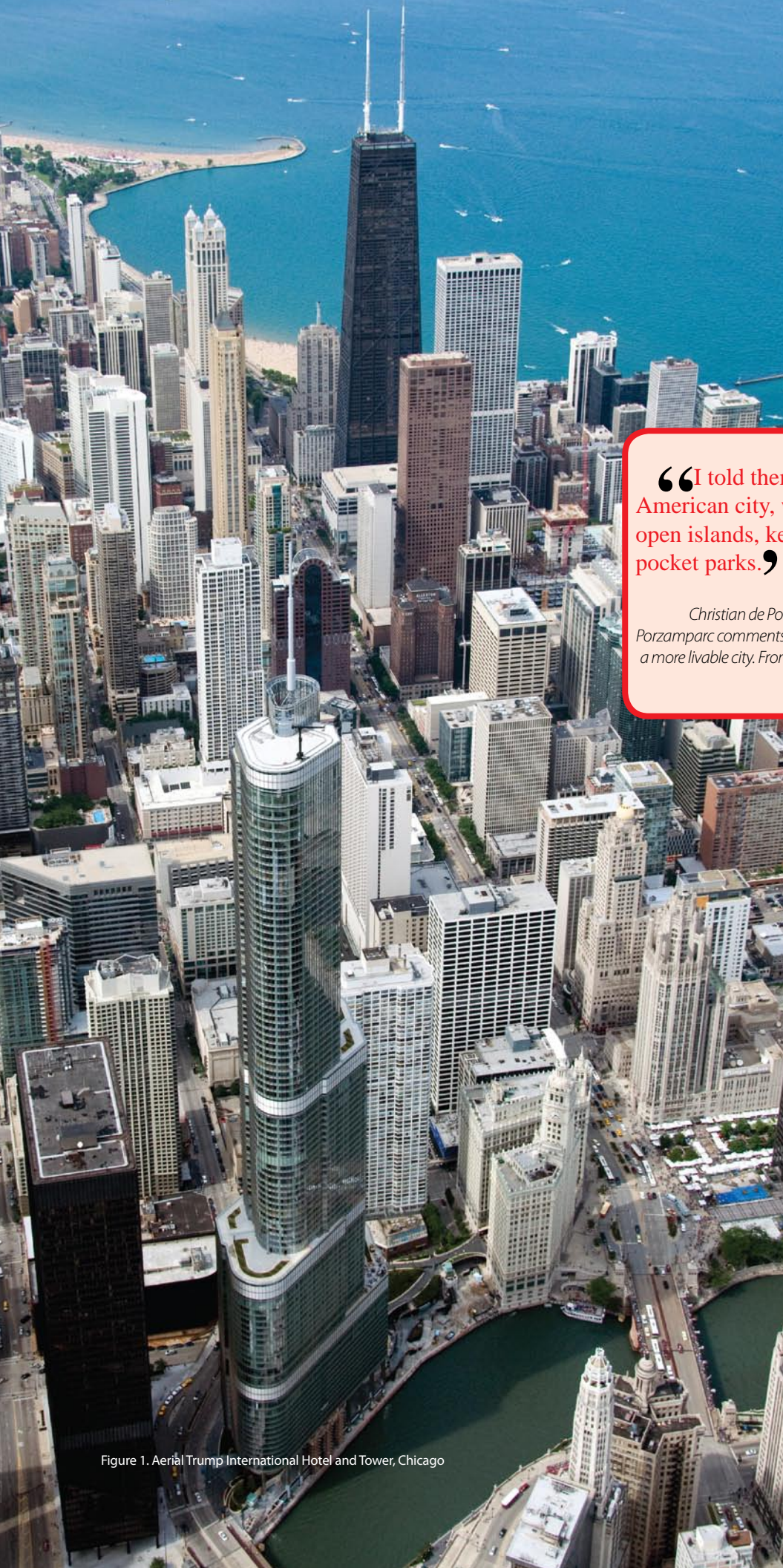


Figure 1. Aerial Trump International Hotel and Tower, Chicago

ground level, further opens up an expansive promenade that steps down, like terraces on a hillside, until it meets the water. This lively gathering place includes retail, pedestrian paths, and an extended riverwalk park system (see Figure 2 on page 18).

...livable city

“I told them it should be like a downtown American city, with three skyscrapers, yes, but with open islands, keeping historic buildings, with pocket parks.”

Christian de Portzamparc, Founder and Principal of Atelier Christian de Portzamparc comments on his urban design proposal for Brussels, to turn it into a more livable city. From 'A Bubble of Diplomats and Officials Is Set to Pop' New York Times, June 22, 2009

In addition to creating a one-acre landscaped riverwalk, this promenade establishes a pedestrian link between North Michigan Avenue (the city's "Gold Coast" shopping district) and State Street (a key corridor that leads to the Chicago Loop). On the northern edge of the tower, at a site formerly used as a loading dock, the plan creates a lushly landscaped, walkable link between Wabash Avenue to the west and the Wrigley Building arcade to the east (see Figure 3 on page 18). A bus lane and drop-off were also planned for Lower East North Water Street to make the tower accessible by public transit and create a connection to the City's future bus corridor along Lower Carroll Street.

Architectural Concept

One of the real luxuries of living in Trump Tower is the view. As the tallest residential building in North America, the tower offers an experience of the city that exists nowhere else, with close-up views of some of Chicago's most well-known buildings. The tower relates to its neighbors through a series of setbacks, the first of which occurs at level 16, at a height that is essentially the same as the cornice line of the 130-meter (427-foot) Wrigley Building, designed by Graham, Anderson, &

Shaping the High-rise Framework: Tall Buildings Policies and Zoning



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"Learning from the Netherlands: Ask not what the city can do for the tall building; ask what the tall building can do for the city."

History has seen some legendary examples of high-rise zoning policy. Certainly the oldest one was drafted and implemented by the Lord himself, as he considered his children to have grown too close to him and, as a result of a policy of miscommunication, left a tower uncompleted. Roman emperors Julius Caesar, Augustus and Nero all set maximum building heights for ancient Rome, for safety reasons and to prevent overcrowding. The tower-minded citizens of the medieval trading city of San Gimignano in Tuscan Italy, were not allowed to build taller than the 165-foot-high tower of the town hall. This limitation was worked around by some erecting twin towers instead. Legend has it that UK's Queen Victoria was so aggravated over the Queen Anne's Mansion building, blocking her views of the Parliament from the Palace, that this triggered the 100-foot height limit on all of London's buildings. This limit lasted from 1894 to 1954.

Origins of high-rise zoning

For centuries, towers were mere iconic and power-boasting incidents in the urban landscape. The invention of the elevator and the introduction of metal framing and new lighting systems in the late 19th century gave a utilitarian function to the tower. Spurred by land prices, fast economic growth and ego boasting, the skylines of Chicago and New York City rapidly became symbols of the new world. As unbridled construction led to unwanted side effects, both cities started to adopt tall building principles as a framework in which market forces were allowed to shape towers. The history of high-rise zoning in Chicago and New York City shows policies based on height, setbacks, volume and floor area ratio (FAR). In the book *Form Follows Finance* (1995), Carol Willis illustrates that, in the course of time, principles of planning and economics have shaped skyscrapers. As a result, they became quintessential for their time and place. Today, the world has become a complex information society and high-rise zoning has become a holistic way of thinking. It incorporates the skills of urban planning, architecture, engineering and politics.

Dutch zoning policy

As the Netherlands is one of the most densely populated countries in the world, one would

expect a natural tendency to build upwards. However, the tallest buildings are a mere 500 feet (150m) tall. High-rise, and urban density in its wake, has become a topic of discussion outside the main cities of Rotterdam, Amsterdam and The Hague in the past ten years. Currently over 25 Dutch cities, some counting just over 50,000 inhabitants, now have policies on high-rise zoning in place. In recent years, buildings of up to 300 feet tall have been erected in these mid-size cities, sometimes as a result of local ambition, but often times as a result of lacking a proper framework or an agenda. In some cases, the erection of tall buildings triggered a tall buildings policy. Especially the less experienced cities are searching for proper tall building guidelines on how to cope with aspiring market initiatives.

With space at a premium, the Netherlands has a history of firmly organized zoning plans in which size, height and function are precisely stipulated. To provide certainty, a zoning plan has a validity of ten years. Until recently, developers could deviate from these plans only if the local government was willing to formalize an anticipated change the next time a zoning plan is up for revision. This must be based on a long-term plan, such as a vision on the development of tall buildings. This basically means that the zoning plans are being adjusted for the actual projects that

...America Tower

“The 54-story result is among the most ungainly forms on the skyline, like a matron who swathes herself in thick layers of fabric in a vain attempt to slim her burgeoning silhouette. The tower climaxes with a spire as impressive as an auto antenna.”

James S. Russell, Writer in New York, on Bank of America Tower in New York. From 'Bank of America's Earnest Eco-Tower Rises From New York Slump' Bloomberg News, July 28, 2009

have already been built. In 2008, this reverse practice was changed for procedures aimed at speeding up the permit approval process, although the underlying principles remained the same (see Figure 1).

Comparative research

To create insights into the way cities shape their high-rise zoning policies, in 2008 the Dutch Council on Tall Buildings commissioned a research project on Dutch high-rise policy. Mixed with over 25 years of council experience, the Rotterdam based architecture firm of Zandbelt&vandenBerg drew up a top ten list of guidelines. These are highlighted in the next paragraphs. They show that high-rise policy in a Dutch, but also European or even western context, isn't just about scarcity, density and height. It is also about agenda, ambition, sustainability and the impact of tall buildings on the urban habitat and environment.

Ten recommendations

There are several reasonable arguments debating the purpose of tall buildings, such as the need for space, high land prices or the desire to create urban density. However, these arguments cannot always be backed up by a proper interpretation of the facts. It is important to understand that in a contemporary, western context, skyscrapers are not necessarily an economical product of high land value. In some Dutch cities, ground lease of government-owned land, which could be an entire city center, is based on building volume, so the market mechanism actually works the other way around. Building tall is also not the same as creating density or urbanity. It will not solve your housing or planning problems nor ensure green open space to remain green and open. Modern skyscrapers can, however, represent an iconic value for a tenant, the city or even a region. **As such, high-rises should be regarded as an opportunity, not a necessity.**

Skyscrapers represent a compact part of the real estate market, meeting the demand for exclusive urban space for those who want to be visible and appreciate the views. At the city level, skyscrapers can create a modern skyline,

not only making the city readable but also creating a powerful image with which both tenants and inhabitants can identify. As such, the message and agenda, which the height embodies, becomes an essential issue. Especially for companies dealing with intangible products, such as financial services, erecting a skyscraper is a way of shaping a presence and an image. The potential size of these markets is relative. On average, five to ten percent of the population of Dutch cities chose to live in the city center because of the proximity to urban amenities and the metropolitan life style. More than any other part of the city, the city center represents the city as a whole. It is a challenge for cities to shape this market, however compact, to the best of their abilities.

Before drafting a high-rise policy, the most important question that needs to be answered is, "What is it that you want tall buildings to do for your city?" The previous paragraphs have already noted that **high-rises are not a panacea for urban density**. This argument is often brought forward in debates about the bigger picture. On a practical level, this is often not the case. Especially outside the city center, tall buildings need breathing room to overcome the negative impacts of building tall, such as shading, strong winds and loss of privacy. The theories on high-rises in the early 20th century were actually written with the idea of creating space in mind, not as a way to create density. These theories were a response to the often dense, overcrowded and badly mixed urban centers of the European cities in the 19th century. In 1930, Dutch architect Jan Duiker envisioned a modern city made up of towers in a park, so all would enjoy the sun and fresh air provided by the space that was created by building vertically. Any building whose number of floors exceeds the maximum FAR demonstrates that there are

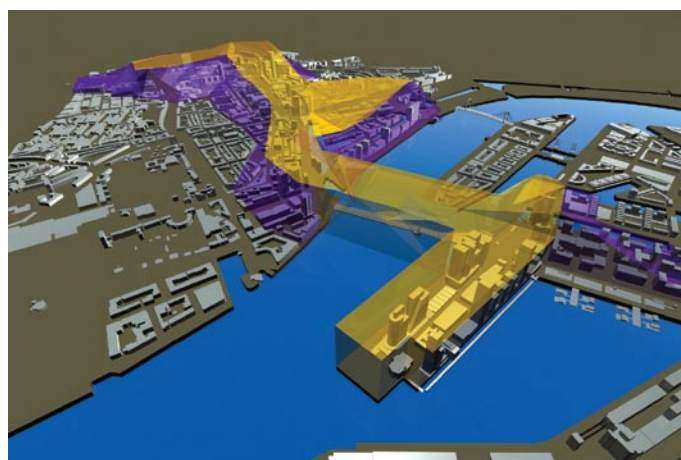


Figure 1. Height zoning in the city center of Rotterdam. The yellow area indicate no height limit, the purple areas are transitional zones of heights in between 70 and 150 meter. © City of Rotterdam

other forces at work than just rational principles. But then again, there is nothing to be ashamed of by saying a skyscraper doesn't have to be a necessity but also can be just plain fun.

At a practical level, **anticipate the impact of high-rises** on the surroundings. Mandatory assessment of the levels of shading and wind is quite common these days. The impact on visual experience, levels of pollution and communication ray paths is not always assessed. For obvious reasons, a **traffic gridlock must be prevented** by studying the impact of the development on the nearby infrastructure. In the wake of this, parking requirements often call for creative solutions. Underground parking, if possible, can be expensive, while upper level parking can be an architectural eyesore. It must be noted that both public and private parties sometimes find themselves hindered in their ambitions because national building codes were not always written with tall buildings in mind. Some of these include outdated rulings on balconies and window frames, but can also include codes on evacuation and fire prevention. A minimum requirement of parking spaces based on function and floor space, silences the debate on whether you should be offering these in dense metropolitan areas in the first place. In cases where typical high-rise related impacts are lacking formalized benchmark codes, cities choose to incorporate these effects into their local policy. In these cases, organizations for standardization, such as *NEderlandse Norm* ↗

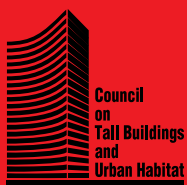
About the Council

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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