Title:	**The "International" Skyscraper: Observations**
Author:	Georges Binder, Managing Director, Buildings & Data SA
Subject:	Urban Design
Keywords:	Density Mixed-Use Urban Design Verticality
Publication Date:	2008
Original Publication:	CTBUH 2008 8th World Congress, Dubai
Paper Type:	1. Book chapter/Part chapter 2. Journal paper 3. **Conference proceeding** 4. Unpublished conference paper 5. Magazine article 6. Unpublished

The "International" Skyscraper: Observations

While using tall buildings data, the following paper aims to show trends and shifts relating to building use and new locations accommodating high-rise buildings. After decades of the American office building being dominate, in the last twelve years we have observed a gradual but major shift from office use to residential and mixed-use for Tall Buildings, and from North America to Asia. The turn of the millennium has also seen major changes in the use of buildings in cities having the longest experience with Tall Buildings. Chicago is witnessing a series of office buildings being transformed into residential or mixed-use buildings, a phenomenon also occurring on a large scale in New York. In midtown Manhattan of New York City we note the transformation of major hotels into residential projects. The transformation of landmark projects in midtown New York City is making an impact, but it is not at all comparable to the number of new projects being built in Asia. When conceiving new projects, we should perhaps bear in mind that, in due time, these will also experience major shifts in uses and we should plan for this in advance.

Author
Georges Binder
Managing Director, BUILDINGS & DATA sa

Buildings & Data sa
Avenue de la Forêt 4 bte 15
B-1050 Brussels, Belgium

t: +32 2-673 0779
f: +32 2-672 0957
e: gmb@buildingsdata.com

www.buildingsdata.com

BUILDINGS & DATA s.a. is specialised in marketing and research studies in the architecture and real estate fields. BUILDINGS & DATA s.a. has its own real estate documentation compiled over a period of more than 30 years and started after a visit by Georges Binder at the World Trade Center in New York City in 1975. It comprises information, databases, plans and images about major architectural and real estate works from around the world and especially covering the buildings of the 12,000,000-square-meter Brussels office market, along with high-rise projects of any type from around the world.
Part of the information is stored in a data base while documents come from architects, developers, investors, real estate agents and all type of commercial and specialized publications such as leasing brochures or architecture books and magazines. Over 100 square meters are necessary to house this library. Georges Binder is regularly invited to collaborate in tall buildings publications.

Introduction

9/10. The day before 9/11, there were 28 towers above 300 meters/984 feet and 2 under construction of the same height. Today, there are 34 such completed towers and over 60 such buildings under construction. Despite predictions by some of the 'end of the skyscraper' in the wake of September 11 2001, it is quite the opposite that is occurring at a pace never before encountered.

Our first Tall Buildings and Super-Tall Buildings boom, in the early 1930's, produced the Chrysler and Empire State Buildings. This era was followed by an economic crisis that put an end to such projects. The next Super-Tall Buildings boom was in the early 1970's, which produced the World Trade Center and the Sears Tower. This era was also followed by an economic crisis, putting an end to such projects for some time. The current boom of Tall Buildings and Super-Tall Buildings, starting with the Petronas Towers in Kuala Lumpur in 1998, the Jin Mao Tower in Shanghai and the Burj Al Arab in Dubai in 1999, seems endless. It has now been followed by a series of Super-Tall Buildings in many regions of the world, including Asia and the Middle-East, particularly Dubai. We also note emerging Super-Tall cities like Moscow, London or even Panama City. Very recently, we have noted a revival of the Super-Tall Building in the United States.

Besides the high number of projects in progress, we note a shift in terms of the locations of these buildings as well as a shift in terms of the buildings' use and principal structural materials. A brief overview of the world's 10 tallest buildings, as seen over a period of 50 years at 10-year intervals, will easily bear witness to this trend. A look to the near future can exterpolate the current situation.

The world's 10 tallest buildings observed over a 50 Year Period, and after.

The seven charts below clearly show the shift in terms of the locations of Super-Tall Buildings – from North America to Asia – as well as a shift in terms of buildings use – office to mixed and other uses, such as residential and hospitality. We also note a shift in terms of principal structural material, from all steel towers to composite towers. The notable exception is the Burj Dubai, the world's next tallest building, being constructed in reinforced concrete.

Many recent Super-Tall Building projects, along with those in progress, are part of a larger urban ensemble (such as in the case of Burj Dubai). Previously, Super-Tall Towers (as in the case of the Empire State Building and the Sears Towers) have been single-tower projects. As a result, these projects will have positive/negative contextual urban qualities. While these early towers have mainly represented corporations in the past, newer projects are now representing larger urban communities, as in the case of Taipei 101 (commercial), Burj Dubai or the Chicago Spire (residential).

Chart 1. World's tallest buildings in 1958

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office
02	Chrysler Building	New York	USA	1930	77	319	1046	Steel	Office
03	Cities Service Building (now AIG)	New York	USA	1932	66	290	952	Steel	Office
04	Bank of Manhattan (now Trump)	New York	USA	1930	70	283	927	Steel	Office
05	RCA Building (now GE Building)	New York	USA	1933	70	259	850	Steel	Office
06	Woolworth Building	New York	USA	1913	57	241	792	Steel	Office
07	Moscow State University	Moscow	USSR	1953	36	240	787	Steel	Education
08	Palace of Culture and Science	Warsaw	Poland	1955	42	231	758	Steel	Education
09	20 Exchange Place	New York	USA	1931	57	226	741	Steel	Office
10	Metropolitan Life Insurance	New York	USA	1909	50	213	700	Steel	Office

Source: © G. Binder/Buildings & Data SA, 2008

In 1958, the world's 10 tallest buildings are mainly office projects located in New York City, and none of these American buildings have been completed in the last 25 years. Two recent buildings are located in Eastern Europe and they have been built according to urban master plans approved by Stalin. With the USSR, the skyscraper becomes a political statement. The structure of all buildings is steel.

Chart 2. World's tallest buildings in 1968

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office
02	Chrysler Building	New York	USA	1930	77	319	1046	Steel	Office
03	Cities Service Building (now AIG)	New York	USA	1932	66	290	952	Steel	Office
04	Bank of Manhattan (now Trump)	New York	USA	1930	70	283	927	Steel	Office
05	RCA Building (now GE Building)	New York	USA	1933	70	259	850	Steel	Office
06	One Chase Manhattan Plaza	New York	USA	1961	60	248	813	Steel	Office
07	Pan Am Building (now MetLife)	New York	USA	1963	59	246	808	Steel	Office
08	Woolworth Building	New York	USA	1913	57	241	792	Steel	Office
09	Moscow State University	Moscow	USSR	1953	36	240	787	Steel	Education
10	Palace of Culture and Science	Warsaw	Poland	1955	42	231	758	Steel	Education

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings in 1968 look much like the ones of 1958 with two major new entries: Pan Am Building and One Chase Manhattan Plaza, the first major buildings built in downtown New York since the 1930's. These two projects are the flagship towers of a series of new corporate towers being built all over the United States at a time that represents the quintessential 'skyscraper' of the time.

Chart 3. World's tallest buildings in 1978

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Sears Tower	Chicago	USA	1974	110	442	1451	Steel	Office
02	One World Trade Center	New York	USA	1971	110	417	1368	Steel	Office
03	Two World Trade Center	New York	USA	1973	110	415	1362	Steel	Office
04	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office
05	Standard Oil (now Aon Center)	Chicago	USA	1973	83	346	1136	Steel	Office
06	John Hancock Center	Chicago	USA	1970	100	344	1127	Steel	Mixed-use
07	Chrysler Building	New York	USA	1930	77	319	1046	Steel	Office
08	First Canadian Place	Toronto	Canada	1975	72	298	978	Steel	Office
09	American International Building	New York	USA	1932	66	290	952	Steel	Office
10	Trump Building	New York	USA	1930	70	283	927	Steel	Office

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings in 1978 includes, for the first time since the 1930's, a new series of Super-Tall Buildings. 3 buildings are taller than the Empire State Building, the world's tallest for 40 years. Chicago makes its mark and a mixed-use skyscraper appears for the first time on the list: the John Hancock Center., It still features in 2008 (but not for long) as the world's highest apartments at over 300meters/1000 feet. Buildings are all located in North America and all are still made of steel.

Chart 4. World's tallest buildings in 1988

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Sears Tower	Chicago	USA	1974	110	442	1451	Steel	Office
02	One World Trade Center	New York	USA	1971	110	417	1368	Steel	Office
03	Two World Trade Center	New York	USA	1973	110	415	1362	Steel	Office
04	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office
05	Standard Oil (now Aon Center)	Chicago	USA	1973	83	346	1136	Steel	Office
06	John Hancock Center	Chicago	USA	1970	100	344	1127	Steel	Mixed-use
07	Chrysler Building	New York	USA	1930	77	319	1046	Steel	Office
08	Texas Commerce Tower	Houston	USA	1982	75	303	993	Mixed	Office
09	Allied Bank Plaza	Houston	USA	1983	71	303	992	Steel	Office
10	First Canadian Place	Toronto	Canada	1975	72	298	978	Steel	Office

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings in 1988 include 2 projects in Houston, following a boom in that local economy. Buildings are all located in North America, as in 1978. For the first time, a building with a composite structure appears in the list.

Chart 5. World's tallest buildings in 1998

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Petronas Towers 1	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office
02	Petronas Towers 2	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office
03	Sears Tower	Chicago	USA	1974	110	442	1451	Steel	Office
04	One World Trade Center	New York	USA	1971	110	417	1368	Steel	Office
05	Two World Trade Center	New York	USA	1973	110	415	1362	Steel	Office
06	CITIC Plaza	Guangzhou	China	1997	80	390	1280	Concrete	Office
07	Shung Hing Square	Shenzhen	China	1996	80	384	1260	Mixed	Office
08	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office
09	Central Plaza	Hong Kong	China	1992	78	374	1227	Concrete	Office
10	Bank of China Tower	Hong Kong	China	1989	70	367	1205	Mixed	Office

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings in 1998 include, for the first time, Asian projects. The first project not designed by an American-based architect, Central Plaza, is completed in 1992 by Dennis Lau of Ng Chun Man & Associates. Asian projects already account for more than 50% of the total.. The 10th tallest building considerably surpasses the 300 meters/1000 feet bar.. For several decades, the Chrysler Building has been the only Super-Tall project to include a spire. In 1998, Super-Tall Buildings with a spire – a trend launched by the Bank of China in Hong Kong – account for 60% of the world's 10 tallest buildings. For more than a century, structures made of steel dominated the tall buildings industry. Steel structures now account for only 40%.

Chart 6. World's tallest buildings in 2008

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Taipei 101	Taipei	Taiwan	2004	101	509	1670	Mixed	Office/Retail
02	Shanghai World Financial Center	Shanghai	China	2008	101	492	1614	Mixed	Mixed-use
03	Petronas Twin Towers 1	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office
04	Petronas Twin Towers 2	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office
05	Sears Tower	Chicago	USA	1974	110	442	1451	Steel	Office
06	Jin Mao Tower	Shanghai	China	1999	88	421	1380	Mixed	Mixed-use
07	Two International Finance Centre	Hong Kong	China	2003	88	415	1362	Mixed	Office
08	CITIC Plaza	Guangzhou	China	1997	80	390	1280	Concrete	Office
09	Shun Hing Square	Shenzhen	China	1996	80	384	1260	Mixed	Office
10	Empire State Building	New York	USA	1931	102	381	1250	Steel	Office

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings in 2008 show the predominance of Asia over North America, which remains on the list thanks to only two buildings . The trend would have been the same even if including the World Trade Center, which disappeared from the list in 2001. The trend observed in 1998 of fewer steel structures continues with only two steel structures left on the list.

Chart 7. World's tallest buildings in 2011

		City	Country	Year	Stories	Meters	Feet	Structure	Use
01	Burj Dubai	Dubai	UAE	2009	162	800+	2625+	Concrete	Mixed-use
02	Chicago Spire	Chicago	USA	2010	150	609	1999	Mixed	Mixed-use
03	Abraj Al Bait	Makkah	S. Arabia	2010	76	595	1952	Concrete	Hotel
04	Freedom Tower	New York	USA	2011	82	541	1776	Mixed	Office
05	Taipeti 101	Taipei	Taiwan	2004	101	509	1670	Mixed	Office/Retail
06	Burj Al Alam	Dubai	UAE	2010	108	501	1588	Mixed	Mixed-use
07	Shanghai World Financial Center	Shanghai	China	2008	101	492	1614	Mixed	Mixed-use
08	International Commerce Centre	Hong Kong	China	2010	108	484	1588	Mixed	Mixed-use
09	Petronas Twin Towers 1	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office
10	Petronas Twin Towers 2	Kuala Lumpur	Malaysia	1998	88	452	1483	Mixed	Office

Source: © G. Binder/Buildings & Data SA, 2008

The world's 10 tallest buildings, expected to be completed by 2011, continues to present a dominating Asian presence. We note an American revival with a residential tower, scheduled to become the tallest building in the United States. The Middle-East confirms its status as a major Super-Tall Building player with more projects than the United States. Europe is back again with a project in Moscow. We also note, for the first time in the history of the skyscraper, that the once dominating office building type now accounts for only 30% of the total The mixed-use building is becoming more popular. With this rise of the mixed-use building, the trend of building names is no longer associated to corporations. which was already confirmed in 2008 . Only the Petronas Twin Towers bears a corporate name associated to a particular brand. By 2011, there will be no more steel-only structures and most of the tallest building in the list of the 10 world's tallest buildings will be made of a composite structure.

The seven above charts clearly show the shift in terms of locations of Super-Tall Buildings – from North America to Asia – as well as a shift in term of buildings use – office to mixed and other uses such as residential and hospitality. We also note a shift in terms of principal structural materials: from all steel structures to composite structures.

Location and use of the over 150-meter/492-foot tall buildings

If we look at the evolution of the Tall Building and we take a closer look at the ones over 150 meters/500 feet (a limit by which any Tall Building starts to appear "big", although this is purely subjective) we will have confirmation that the trends shown by the world's 10 tallest buildings are also to be seen in some 3000 projects completed and under construction (Table 1).

If we take a look at the location where we find buildings of over 150 meters/492 feet tall, we note that, back in 1995, 2/3 were located in the Americas (mainly in the United States). This is down from about 85% in 1980. This group now represents only 27.7% in 2008 if we also take into account projects under construction and only 18.4% if we only look at projects under construction. The regions most active today are the Asian ones. Asia/Oceania/Middle-East, which used to account for less than 10% in 1980 and for 31.3% in 1995, now are 68.8% of the total, including projects under construction. If we look at only projects under construction , we note that the Asian regions account for 77.5%. The percentage of projects currently under construction in only the Middle-East stands at 23% of the total, a figure that was virtually zero back in 1995.

Source: © Georges Binder/Marshall Gerometta, 10/2007
(*) While every effort has been made to track accurate data on height figures, when height was missing, estimates have been drawn for a number of projects taking into account both the known number of stories and the building's use.

Table 1. Buildings over 150 meters/492 feet shown according to location (*)

	1980	1995	2008 Plus Those Under Construction	Those Under Construction Only
Americas	84.9%	64.5%	27.7%	18.4%
Asia/Oceania	9.9%	31.2%	59.0%	54.5%
Middle-East	0.0%	0.1%	9.8%	23.0%
Europe	4.3%	3.7%	3.3%	3.8%
Africa	0.9%	0.5%	0.2%	0.3%
Total number of buildings	324	820	2922	7

Table 2. Buildings over 150 meters/492 feet shown according to building use (*)

	1980	1995	2008 Plus Those Under Construction	Those Under Construction Only
Office	84.7%	78.3%	47.3%	26.8%
Mixed-use	5.2%	6.6%	11%	17.7%
Residential	5.2%	9.6%	35.3%	47.3%
Hotel	4.9%	5.5%	6.4%	8.2%

In Table 2 we can see that, in 1980 and 1995, the vast majority of tall buildings (84.7% and 78.3% respectively) were destined for office use. The current percentage in this category is only 47.3%. Where buildings under construction are concerned, the figure drops to 26.8% of the total. At the same time we can see that the residential building, previously a marginal Tall Building type, is now becoming the most widely built category with 47.3% of the total currently under construction. We also note a steady rise of the mixed-use Tall Building, rising from 5.3% in 1980 to 11.0% today. With 17.7% currently under construction, we can expect a bright future for this building type.

If we compare the two charts above we note that the Tall Building, mainly a North American office building a little over 12 years ago, is now fast becoming an Asian residential building. To a large extent this is the conclusion we draw based upon the types of projects that are being erected.

Selected building types observations

The mixed-use tall building

The mixed-use Tall Building is becoming more and more popular. The corporate office tower, once a major urban landmark in many cities, is now being replaced by mixed-use buildings. Recently completed and under construction Super-tall office towers and mixed-use projects, such as the Petronas Twin Towers, Taipei 101 or Buj Dubai, include a world-class shopping mall featuring an array of well-known international brands. Until the turn of the millennium, all of the previous world's tallest buildings were single-use towers, mainly devoted to office use. Exceptions are the World Trade Center and the Empire State Building in New York, both of which featured limited retail facilities of local interest only. In addition to these, there are an increasing numbers of mixed-used buildings being built every day. This building type now accounts for just under 20% of the total number of over 150-meter/492-foot buildings under construction. The interest in this building type can probably be explained by several factors. Considering the ever increasing number of buildings being erected, there may be a lack of major tenants able to fill these buildings. Along with this is a world where tourism is an economy on the rise. Hotels are becoming the "major tenants" of the new millennium. Additionally, mixed-use is evolving in cities that are no longer building administrative areas only, but mixed-use districts. Moscow in Russia is witnessing a revival of high-rise construction after two generations without it. The United Kingdom is reviving it after one generation. We note that the mixed-use Tall Building is becoming the new urban flagship tower, as in the case of the Federation Tower and Russia Tower in Moscow and the Shard London Bridge in London. This trend continues throughout the United Kingdom with projects such as 10 Holloway Circus in Birmingham, the West Tower in Liverpool and Beetham Tower in Manchester. Although these examples represent a limited number of such projects, the fact that they are the first or among the first Tall Buildings of a new generation of such projects, located in high-profile locations in their respective city, means that they could become catalysts for more to be built in the same vein. In addition, flagship Tall Buildings of several cities are mixed-use projects and are no longer office towers, as in the past in the United States and Europe. , There could follow wider acceptance of this building type in locations such as Europe, where it has not been since the mid-1970's and the post 1968 events .

The tall retail and entertainment mall

The tall shopping mall may become a Tall Building category in its own right or a sub-category within the mixed-use Tall Buildings category.The retail and entertainment mall is now becoming taller and taller. A 6 to 8-level shopping mall used to be considered as a tall shopping mall 30 years ago. These were found in Asian locations such as Hong Kong or Singapore with a few exceptions in other parts of the world, such as in Chicago. It remains one of the American cities where vertical malls seem to work. The tall mall is still mainly an Asian building type. What is new today, in terms of this building type, is that the vertical mall has been reaching new heights since the turn of the new millennium. In Hong Kong, Langham Place, a mixed-use 59-story tall building completed in 2004 includes a 13 - story high shopping mall. MegaBox, also in Hong Kong, is a 19-story shopping mall which is part of a 35-story mixed-use tower completed in 2007 (Figure 1). Both projects are surmounted by an office building while Langham Place also includes a 42-story hotel located across the street and linked by a glassed sky-bridge. We note in each of these vertical malls that retail and entertainment levels are grouped in blocks of around 4 levels arranged around their own atrium or elevated plaza. Each group can be reached by so called "express escalators". These are escalators moving at the same speed as other escalators but reaching each group of 4 levels in a single flight. To call them "direct escalators" would perhaps be more accurate. Langham Place, it should be noted, features Hong Kong's longest escalators.

These self-contained venues don't even need to be located in central locations anymore, as had been the case. Langham Place is located in a very densely populated area that stands next to Mong Kok station, 3 stops from Tsim Cha Tsui, Hong Kong Kowloon's main station. MegaBox is not even located next to a subway station at all. MegaBox is part of a newly built ensemble comprising several office buildings erected in a former semi-industrial area. MegaBox is in fact located 400 meters/1312 feet away from the nearest subway station and is linked to the subway via a free shuttle bus service provide by the shopping mall. Newly opened in June 2007, super-tall MegaBox mall has already proven to be a success when visitor numbers are considered.

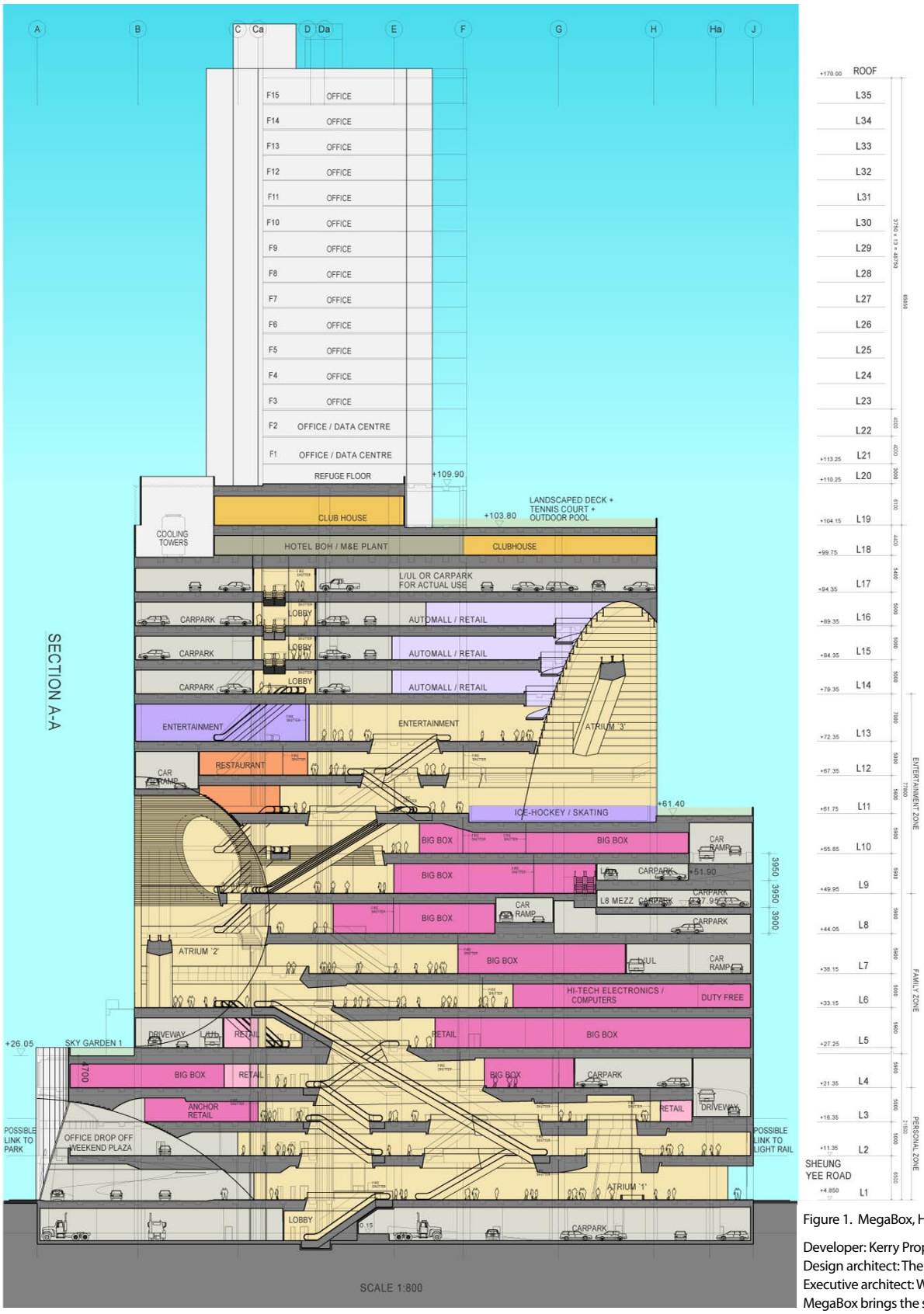


Figure 1. MegaBox, Hong Kong, China, 2007

Developer: Kerry Properties Limited
Design architect: The Jerde Partnership
Executive architect: Wong Tung & Partners Limited
MegaBox brings the shopping mall to new heights.

The residential Tall Building typology according to a particular region or when daylight and ventilation requirements impact on the design

Considering the ever increasing numbers of residential high-rise buildings as opposed to office buildings, we note that the residential typology of the Tall Building may vary a great deal from region to region. This contradicts the common belief that Tall Buildings are the same all over the world. Apart from any stylistic or aesthetic considerations, we note of particular interest the Chinese residential tall building, originating in Hong Kong. Its typical floor plan is radically different from those of any other region of the world.

The typical Hong Kong high-rise residential floor plan – which can also be found in mainland China – differs widely from the rest of the world's typical residential floor plans . The Hong Kong Building (Planning) Regulations (B(P)R), first enacted in 1956, stipulate the requirements for lighting and ventilation of different rooms found in residential buildings. These regulations are namely for habitation, preparation of food and bathrooms and lavatories. Common staircases to multiple-occupant buildings also require natural lighting under the B(P)R. Living rooms and bedrooms must meet the most stringent criteria and typically affect the overall disposition and orientation of buildings. Under the B(P)R, kitchens must face towards "external air", (i.e. towards the outside of buildings) while bathrooms must face into "open air", which can either be towards the outside or into a light-well. The dimensions of light-wells for "open air" must increase with building height, thereby rendering their use impractical for high-rise buildings. This requirement gives rise to the distinctive and highly articulated cellular "cruciform" and "trident" floor plans of most residential high-rise buildings in Hong Kong today (Figure 2).

Since 1997 the Building Authority in Hong Kong has accepted proposals for new residential buildings that depart from the Building (Planning) Regulations by providing mechanical ventilation and artificial lighting to bathrooms and lavatories in lieu of natural lighting and ventilation.

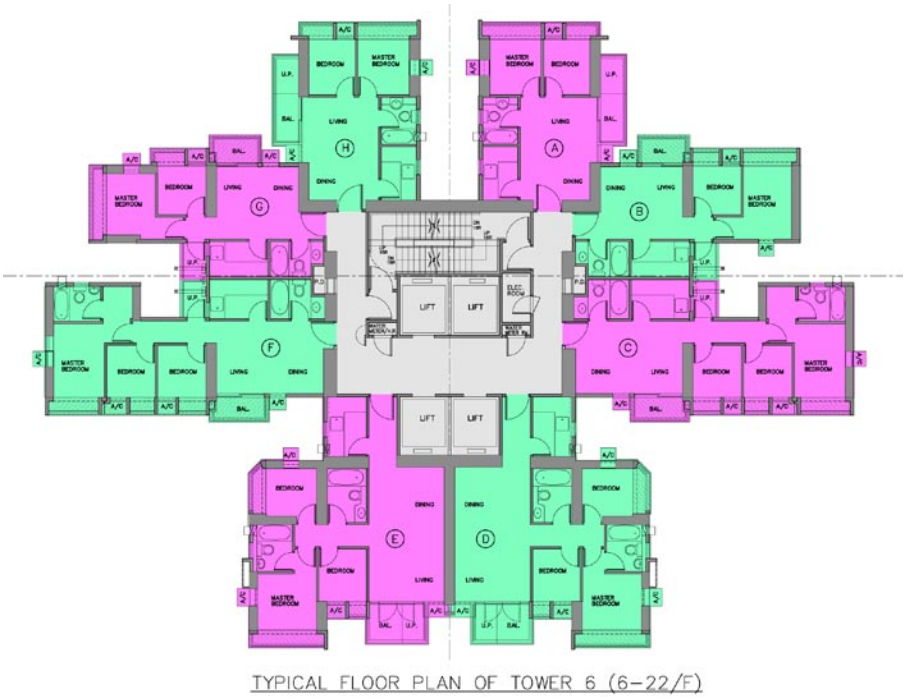


Figure 2. Grand Waterfront, Hong Kong, China, 2007

Developer: Towngas
Architect: Dennis Lau & Ng Chun Man, Architects & Engineers: (H.K.) Limited

As an example, the Grand Waterfront typical floor plan clearly shows how most Hong Kong residential towers differ from residential towers located in Western locations.

This government relaxation of the B(P)R could have a significant effect upon floorplans, the variety of apartment layouts available, and upon the volume of the external building envelope. So far, however, the freedom to dispense with natural lighting and ventilation to bathrooms and lavatories has not yet met with a favorable response from the market. The majority of new housing being built in Hong Kong still conforms to the B(P)R.

The Building (Planning) Regulations have obviously induced a variety of diverse articulated or cruciform floorplans, with longer linear façades. Most of the typical floor plans in other parts of the world, such as North America and Europe, are more compact-looking and are often found in more conventional shapes, such as squares or rectangles. The overwhelming majority of apartments in the Hong Kong territory still conforms, one way or another, to the cruciform tower block with eight apartments per floor in the private sector and up to sixteen per floor in the public-funded sector.

The office Tall Building

Regarding the tall office building, we note that typical floor plans are generally common to many regions. However, in Europe we note that most of them have the façade located not far from the core. The reason is the law requiring such layouts in countries like France or Germany. In France the maximum distance between the core and the façade is 6.5 meters/21.3 feet. In Germany this distance is 7 meters/23 feet. Generally speaking, we could say that this forms part of the European culture, work habits and well being. In Belgium, there is no rule regarding the distance between the core and the façade but there are rules regarding the quality of light for workers. Indirectly, this results in market demand of having relatively short distances between the core and the façades, often complying with distances found in France and Germany.

In some locations, we observe typical floor plans. In Hong Kong, we note a very high number of typical floor plates with side-core service and elevator cores. This can probably be explained by the fact that many Tall Buildings have a rather small floor plate and/or are facing the bay, which becomes the main view to offer to the building occupants. Therefore, the core is moved to the back façade to allow views to more occupants. More fundamentally, it is simply the only way to use the small floor plates in a functional way.

Conversion of uses on a major scale in mature (American) Tall Building markets

Over the years, several office towers have been transformed or are being transformed now. One of the first examples is Trump International Hotel & Tower in New York, converted in 1997, and originally known in 1971 as the Gulf+Western building. It has been transformed from office to hotel and housing. In Chicago, the mixed-use 900 North Michigan has just turned nine former office levels into residential levels. Also in Chicago, the huge 1972 Mid-Continental Plaza is currently witnessing the same radical change with the upper 15 levels being turned to residential use and renamed Park Monroe. At one time, the owner of the former IBM Building studied its conversion to housing but, in this case, it will remain a study only.

In midtown Manhattan in New York City along Central Park South, facing Central Park, a series of famous hotels have disappeared in recent years or are shrinking in size. The most famous of them is the Plaza. From 805 rooms, it will be reduced to 282 rooms. The other rooms are being transformed into residential units. The same conversion has occurred to the St. Moritz, now a Ritz-Carlton mixed-use tower. Not far away, The St. Regis and the Mark are following the same trend. Other hotels like the InterContinental, the Helmsley Windsor, the Mayflower, the Stanhope, the Westbury, the Delmonico, and the Drake have all closed. Some have been demolished and some are still awaiting decisions on their future. Many have been transformed into high-end residential projects. City mayors are fighting hard to bring residential projects back to the center of their towns. It may be appropriate to question, in this regard, whether these high-end residential projects will add life to these major downtown districts or if, by contrast, the 24-hour activity and nightlife will disappear along with these vanishing hotels.

In downtown New York City, we can observe this kind of phenomenon. A number of old projects have been renovated and transformed into residential projects from old office buildings because they no longer responded to current demand. This allows the creation of thousands of new residential units in an area that, 25 years ago, was almost entirely devoted to offices, excluding the Battery Park City area .

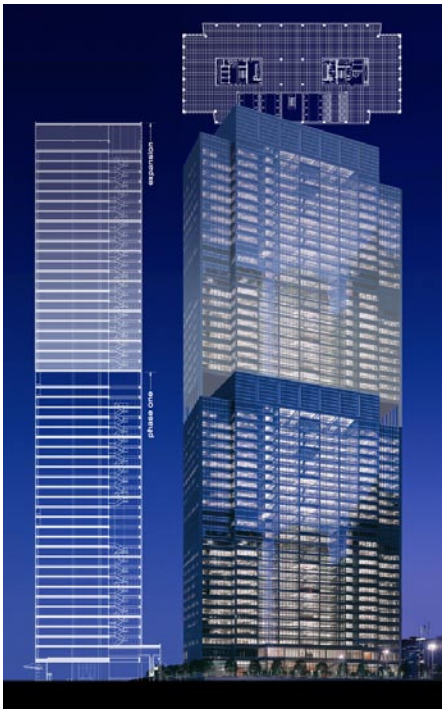
Since 1995, tax rebates and other New York City incentives have helped this process to reach unexpected levels. It is mainly since the World Trade Center attacks that we can see the acceleration of this process.

In addition to conversions of office buildings, we also note a revival of new high-rise residential and hospitality projects . At the end of 2010, we can expect around ten newly built residential and hospitality high-rise projects to be completed in New York City alone, including a super-tall 74 story tower. This is more than in the entire past century .

More than any other period, we are now witnessing a shift in uses of buildings and places to live within New York City. This process is also happening in other American locations, with Chicago a good example. There, several office buildings have been transformed in recent years or are currently being transformed. This is partly explained by the creation, in 2004, of Millennium Park, located between Lake Michigan and South Michigan Avenue, a major Chicago boulevard.

Density, floor area ratio (FAR), the two-phase Tall Building or the evolutionary FAR

Height seems to be the number one aspect related to Tall Buildings and the most visible one in the mind of the public. Perhaps, but is it the only element? Density is probably the main aspect relating to the construction of Tall Buildings. Its measure is the floor area ratio or FAR. The FAR is the multiplication of the size of the site area with a ratio that will lead to the total above ground built area allowed on this site.



Figures 3/4. Blue Cross BlueShield of Illinois Headquarters, Chicago, Illinois, USA, 1997/2010

Client: Health Care Service Corporation
Architect: Goettsch Partners

BlueCross BlueShield, is the first two-phase tall building. The 32-story building originally built in 1997 (phase 1) will comprise 57 levels when fully completed in 2010.

Rendering: Goettsch Partners

Density and FAR could take up an entire chapter, but in view of the limited space available in these pages, we will just take a look at a new way of adding density to a site: designing – and building – projects according to a multi-phasing process allowing the construction of expandable tall buildings.

In Chicago, the BlueCross BlueShield of Illinois Headquarters Building, also known as 300 East Randolph, was originally designed by Lohan Associates (now Goettsch Partners). The existing building was completed in 1997 and was planned during a period not favorable to speculative projects (Figure 3). The project was therefore built to respond to the then current needs of the occupant, with no more space built than was immediately necessary. The design allowed the vertical expansion of the building in a second phase. The project as completed comprises 32 stories and 132,944 square meters/1,431,000 square feet. It has been designed to expand vertically to reach 57 stories with a total capacity of 214,978 square meters/2,314,000 square feet (Figure 4). The solution will be achieved by moving the elevator banks, conventionally located in the central core, to a five-bay glazed atrium at the back of the building. Banks of elevators for future expansions will be added to the unoccupied bays and existing operations will be uninterrupted.

The vertical expansion of the project, actually the original design completion phase designed by Goettsch Partners, is now currently under construction. The 1997 project's 10.5 net FAR will increase to 18 net FAR when fully completed in 2010.

Numbers and symbols

Within the Council on Tall Buildings and Urban Habitat the height of buildings has often been discussed: whether a spire should be included in the overall height or not and how to measure the building height in general. Much can be said about this and it is not a subject for discussion here. However, regarding building height, the other parameter used to calculate it is the floor count. It should be noted that only the actual number of levels really matters. Additionally, there are several factors that influence floor numbering and the published floor numbering is an important factor linked to the marketing of the project. Numbering does not always reflect the actual number of built levels.

First of all, there are the lucky numbers we began to discover around a decade ago upon the completion of the Petronas Towers and later the Jin Mao Tower. Both officially have 88 stories as 8 is a lucky number in Asia. In the case of Taipei 101 and the Jin Mao Tower, the buildings' main tower sections are actually designed around the number eight and this can been seen when we look at the buildings' elevations and plans. The Jin Mao Tower officially has 88 levels. However, the building has 88 stories and an additional 4 penthouse levels. Regarding the number of stories of Taipei 101, Harace Lin, the developer of the current world's tallest building says: "100 would be a perfect number, but I wanted it to be more than perfect". After much thought, Harace Lin arrived at the 101 figure that would later become part of the Taipei 101 brand name, symbolising both 101 levels and the binary digital world we are now working and living in.

There are also a number of locations, such as Hong Kong, where many buildings have floor numberings where there are no levels 4, 14, 24, 34, 44, 54 and so on, since these are unlucky numbers. Should you have to visit a friend on a so called level 65 in Tower 6, for instance, in a residential ensemble comprising several towers, that doesn't mean that there are 6 towers since there is almost no towers named Tower 4 in any Hong Kong multi-tower ensemble. Tower 6, as mentioned in the previous example, is most probably the project's fifth tower and the so-called level 65 is probably the actual level 58, since there are no levels ending with 4.

The same may also apply to level 13 for many North American high-rise buildings, as this is also considered an unlucky number.

6000 by the year 2020…

Considering that we can already forecast most of the projects that will be completed by the end of the current decade, and armed with the knowledge of the figures of over 150 - meter/492-foot projects completed since the early 1950's, we are able to observe an average increase of 102% during each of the last 5 decades. This average increase is actually on the rise when we look at the current decade. We can already calculate that more than 1,700 such buildings will be built, a 140% increase over the 1990's, during which we observed a 96% increase over the 1980's. With a history of 50 years, during which we have observed that the total number of over 150-meter/492-foot buildings doubled on an average of every 10 years, is it presumptuous to draw the hypothetical estimate that this number will again – at the minimum – double during the next decade? This would lead us to believe that, on December 31 2020, the world will accommodate around 6,000 completed projects of this height. That will be about 100 times the number of such projects completed by the early 1930s (Table 3).

Table 3. World's tallest buildings over 150 meters/492 feet completed during each decade (*)

	Projects built during each decade	Total	Increase over the previous decade
1900s	1	1	
1910s	7	8	
1920s	37	45	
1930s	20	65	
1940s	4	69	
1950s	20	89	
1960s	74	163	83%
1970s	162	325	99%
1980s	294	619	90%
1990s	597	1216	96%
2000s	1706 (**)	2922 (**)	140%

Source: © Georges Binder/Marshall Gerometta, 10/2007

(*) While every effort has been made to track accurate data on height figures, when height was missing, estimates have been drawn for a number of projects taking into account both the known number of stories and the building's use. (**) Scheduled as of October 1, 2007

Taking into account projects already under construction, we can estimate that there will be about 3000 completed tall buildings over 150 meters/492 feet on December 31, 2010. We note that there is a 102% average increase per decade over a 50-year period. Considering the very conservative average increase of 102% of completed tall buildings over 150 meters/492 feet every decade, we can draw the hypothetical conclusion that the world may accommodate about 6000 such buildings or more at the end of 2020.

Conclusion

"And so Sears Tower will hold its height record in perpetuity" wrote Paul Gapp, architecture critic, in 1980 in the Chicago Tribune. Gapp was summarizing factors against Tall Buildings, such as the large plazas associated to Tall Buildings supposedly disliked by the public and the "growing public distaste" for such buildings. There was also a lack of need seen in the future for tall platforms for telecommunications use because of cable technology and satellites. Gapp appeared to be right for almost 20 years, but quite obviously, there is still a need for elevated platforms able to house broadcast telecommunications antennae in some locations. Equally as obvious, the Super-Tall Building seems to be as popular today as it has ever been in history. We observe three cycles of construction periods for Super-Tall skyscrapers: the late 1920's-early 1930's, the early 1970's and the most recent one, which started in the mid-1990's and will be active for several more years even if no new projects are announced.

From a product originally located in one place (the United States of America) and mono-use (office), we have evolved to a current situation where skyscrapers are now being developed on every continent, especially in Asia. Tall Buildings currently under progress are now predominantly residential or mixed-use projects. The skyscraper, as the iconic corporate symbol it used to be, may soon become a thing of the past.

When Gapp predicted the end of the super-tall skyscraper in the early 1980's, the so-called "Postmodernism" was at its peak in terms of media coverage. The AT&T Building, designed by Johnson/Burgee, was being published everywhere. Modernism, presented up until that time, was the unique way of reflecting modernity. Modernism reflecting modernity was receding, along with the image of the corporate world that would solve all of the people's daily problems. To reduce Super-Tall Buildings to these aspects alone was probably a limited vision. The fact that we are now witnessing a large number of Super-Tall skyscrapers under progress does not in any way mean that building Super-Tall skyscrapers is the right answer to people's needs in terms of living together. It does obviously seem to mean that the product is being more and more widely accepted since it has been adopted in so many places for many different uses. In addition, perhaps the fact that it is being used by different categories of occupants, such as office (albeit less and less), housing, hotels or in some cases hospitals or courts, probably helps its wide acceptance. The Tall Building is no longer seen as a corporate symbol intruding into people's lives.

The once corporate symbol of the few is now becoming the symbol of the masses, symbolizing a whole city, region or country. This is the case of Taipei 101, Burj Dubai, Chicago Spire or Freedom Tower, even if these buildings are designed to respond to the needs of the upper tier of the population of the region in where they are located.

It is also appropriate to note that in mature Tall Building markets, such as Chicago and New York City, conversion of uses is occurring on a large scale. Office and hospitality towers are being transformed into residential or mixed-use buildings. When conceiving new projects, we should perhaps bear in mind that, in due time, these will also experience major shifts in uses that we should plan for ahead of time.

References

Interview (by the author) of Harace Lin, President of TAIPEI 101 in Taipei, Taiwan, on July 23, 2007

GAPP, P. (September 14, 1980), ***Chicago Tribune***, Chicago, Illinois, USA