

KONE'S MAGAZINE

ISSUE 10



# people flow

LIVING THE  
SKY LIFE



BREAKING  
HIGH-RISE LIMITS  
REVOLUTIONARY  
ROPE

# Looking to the next leap

Urbanization is a guiding megatrend for our business. At the same time, our business enables the growth of cities as buildings soar to increasing heights. Without elevators this development would not be possible.

We are proud that KONE's innovative solutions enable the smooth flow of people in four of the ten tallest buildings completed last year, including Leatop Plaza in Guangzhou, China, a symbolic landmark for environmentally-intelligent buildings. Looking ahead, growth in super high-rise building is especially strong in Asia and the Middle East. Plans are already underway for buildings that top the one kilometer mark.

This coming leap in building heights means that it is also time for the next leap in elevator technology. The new KONE UltraRope™ represents that leap. KONE's new hoisting technology leads to much better energy efficiency than conventional ropes, and the longer the travel distance, the bigger the benefits. It is also far less sensitive to building sway, meaning a significant reduction in elevator downtime in tall buildings.

KONE's historic successes are the result of innovative thinking. To succeed in the future, we must continue on this path of finding creative solutions for the challenges of tomorrow.



**Matti Alahuhta**

President & CEO, KONE Corporation

## KONE IN BRIEF

KONE is one of the global leaders in the elevator and escalator industry. The company has been committed to understanding the needs of its customers for the past century, providing industry-leading elevators, escalators and automatic building doors as well as innovative solutions for modernization and maintenance. The company's objective is to offer the best People Flow® experience by developing and delivering solutions that enable people to move smoothly, safely, comfortably and without waiting in buildings in an increasingly urbanizing environment. KONE employs 40,000 dedicated experts to serve you globally and locally. We have activities in close to 150 countries across the globe.

[www.kone.com](http://www.kone.com)

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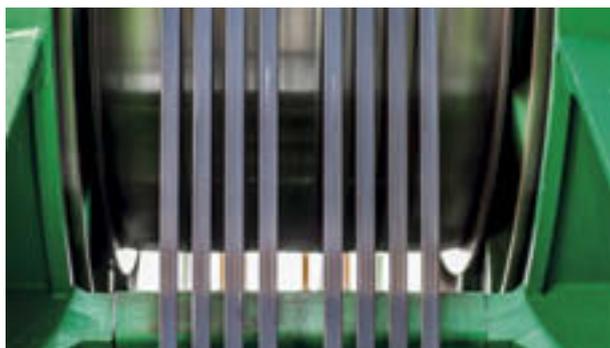
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With the population of the world growing at a rapid rate, land in our cities is under greater pressure than ever before. Building tall represents the only sustainable solution, says Antony Wood, Executive Director of the Council on Tall Buildings and Urban Habitat (CTBUH). And, he believes, advances in building technologies and intelligence mean there is no longer any structural limit on how tall buildings can go.

TEXT CLAIRE PRENTICE PHOTOS GRANTLY LYNCH AND KONE

# THE ONLY WAY IS UP

**E**very day, nearly 200,000 people move or are born into urban areas around the world. To accommodate, the equivalent of a new city of more than one million people needs to be built every week. It's an astonishing statistic and one which has profound implications for the future face of the world.

So can we afford to keep growing outward into rural areas? Or is the only

way upward, building dazzling cities in the sky?

**Antony Wood**, the executive director of the Council on Tall Buildings and Urban Habitat (CTBUH), believes the horizontal model of urban development with a dense downtown working core and ever-expanding suburbs has had its day.

"It's unsustainable in the future because of the energy it takes to create and operate that city," says Wood.

"It's mostly about the infrastructure – the roads, the sewage, the power and transportation to and from city to suburb and the energy that's wasted, the time that's wasted, the pollution that's created. Humanity can no longer survive on this planet unless our cities densify."

## NEW EUROPEAN HEIGHTS

While North America, Asia and the Middle East have embraced the →

## ABOUT CTBUH

Founded in 1969, the Council on Tall Buildings and Urban Habitat is an international not-for-profit organization supported by architecture, engineering, planning, development, and construction professionals. The CTBUH is the world's leading body in the field of tall buildings and the recognized source of information on tall buildings internationally.

For more information, visit <http://www.ctbuh.org>

# 1,000,000

THE EQUIVALENT OF A CITY OF 1 MILLION PEOPLE IS CREATED EVERY WEEK AS PEOPLE AROUND THE WORLD MOVE TO OR ARE BORN INTO URBAN AREAS.

skyscraper, Europe has traditionally been resistant to growing upwards. The only European building in the top 100 tallest buildings in the world is The Shard in London (306 meters) at number 56. But with increasing pressure on land, combined with financial and sustainability factors, even traditionally anti-tall cities like London and Paris are rethinking their skylines.

Europe might never be home to the biggest, but it is giving rise to some of the most exciting tall buildings around.

*The Council on Tall Buildings and Urban Habitat is based at the Illinois Institute of Technology in Chicago, Illinois, United States.*

“Some of the greatest advances in skyscraper development in the last ten years, certainly environmentally, have happened in Europe,” says Wood.

#### **A SYMBOL OF PROSPERITY**

To see how the skyscraper has become a global symbol of modernity and prosperity one need do no more than track its expansion across the world.

The Home Insurance Building (55 meters) built in Chicago in 1885 was the world’s first skyscraper. For more than a century, the United States was home to the world’s tallest buildings. Then Malaysia’s Petronas Twin Towers (452 meters) took the prestigious title in 1998. Asia and the Middle East have

dominated the race ever since. Today the Burj Khalifa (828 meters) in Dubai is the world’s tallest, while the first ever one kilometer-tall building, the Kingdom Tower in Jeddah, Saudi Arabia, is scheduled to be completed in 2018.

Not so long ago such heights would have been unimaginable. But advances in building technologies, expertise and intelligence have enabled buildings to keep getting taller. Wood believes there are no longer any structural limits on how tall buildings can go. “People say to me ‘can we build a mile-high tower?’ The answer is yes, if we’ve got someone to pay for it,” he says.

#### **SKYSCRAPER OF THE FUTURE**

Tall buildings might represent a more sustainable future, but concrete and steel are among some of the most energy-intensive materials on the planet. As well as innovations like solar panels, green roofs and energy-efficient double skin facades, architects are looking at ways to dramatically re-imagine the skyscraper to make it more environmentally friendly. Proposals include



the “woodscaper”, a skyscraper made using wood panels up to 19.5 meters long and 2.4 meters wide, designed by the Vancouver-based architect Michael Green.

In the early days, the rapid upwards growth of cities like Chicago and New York was driven by technological advances coupled with the desire on the part of corporations and retailers to be concentrated in the city center. Additionally, iconic skyscrapers like the Chrysler and Woolworth Buildings were an integral part of the branding of the corporations they housed. Today skyscrapers have taken on an additional role, of promoting the city they are located in as an important world center for business and commerce.

But how can we make tall cities livable, loveable places to call home? The key lies in radically rethinking the skyscraper as a place not just to work, sleep and eat,

but as somewhere to relax and have fun, by incorporating green spaces like parks, gardens and walking paths. The Petronas Towers in Malaysia (the world’s tallest from 1998 to 2004) incorporates an art gallery, an aquarium, a concert hall, a children’s playground, wading pools and jogging paths.

Wood is a powerful advocate for the continuing rise of the skyscraper and believes they can accommodate anything human beings demand of them. But he draws the line at a vertical future in which no one ever has to step outside again. “I don’t think we should strive for that. To me, the idea of staying inside a single building for days on end is like a horror story.” ■

## BRINGING LIFE TO THE TOWERS

Architects are dreaming up a host of imaginative and visionary ways to make tall buildings greener. They include incorporating aquaponics pods into residential, office or mixed-use buildings. Aquaponics is a closed system of agriculture which involves aquaculture (the farming of aquatic organisms such as fish or prawns) and hydroponics (a method of growing plants that uses water instead of soil).

The fish produce ammonia-rich waste which is then broken down by bacteria in the fish tanks into nitrates which then pass to tanks containing the plants which absorb the nitrates as food via their roots. As well as fertilizing the plants, the process filters the water. Oxygenated filtered water, along with waste material generated by the plants, is then fed to the fish.

Such a system could be combined with an array of green roofs, together producing vegetables, herbs and hundreds of thousands of fish annually to feed the residents of the building.





# DIVING DEEP TO RISE HIGH

TEXT LAURA VINHA PHOTOS KONE

Sometimes you need to dive deep to reach the sky. This is exactly what KONE did to become one of the leading elevator suppliers to the world's skyscrapers. But the story of the world's tallest elevator test tower – a shaft dug 350 meters into a damp and dark limestone mine – is only part of KONE's quickly evolving high-rise story.

**N**o one could have guessed that a small machine shop founded some 100 years ago in the capital of Finland, a remote country with no real skyscrapers of its own, would one day become a leading elevator supplier to some of the world's tallest and most impressive landmarks. Yet this is exactly what KONE has done.

KONE's solutions enable the smooth flow of people at sites as diverse as the Marina Bay Sands integrated resort in Singapore; The Shard in London, Europe's tallest building at 306 meters; and the iconic Trump International Hotel and Tower in Chicago, at 423 meters the tallest building built in 2009. With cities growing taller and buildings soaring to new heights, KONE's high-rise story has only just begun.

*Left: Johannes de Jong has a lot to smile about when he considers the future of high-rise elevator technology. Right: Once completed in 2017, the Chongqing International Trade and Commerce Center will house the world's highest-traveling KONE elevator.*

"Our technology is top of the game. We can be really proud. Eco-efficiency, ride comfort – we are very far along with these," says KONE Head of Technology for Major Projects **Johannes de Jong**, explaining what sets KONE apart in the high-rise elevator market. "And the way we deal with customers, the enthusiasm of our people, that's not easy to copy. We are a big company, but there's still a feeling of family."

#### EARLY DAYS

KONE's high-rise story began in the mid-1970s when it bought the European subsidiaries of American Westinghouse, doubling its business volume and gaining skyscraper expertise which, until then, it had lacked. De Jong joined the company around the same time.

Another milestone was KONE's acquisition of Australia's EPL in 1990. "This is when KONE really went into the high-rise business." KONE also began to understand better the elements of ensuring a comfortable high-rise elevator ride, an important criterion particularly in the increasingly significant Asian market.

#### DIVING TO RECORD HEIGHTS

In the mid-1990s, KONE had already made breakthroughs in its volume products with the introduction of innovations such as the world's first machine-room-less elevator, the KONE MonoSpace®. "We started thinking we needed to have similar products for high-rises and a place to test them," says de Jong.

After initial contemplation on the construction of a test tower, KONE started thinking deep rather than tall and found the Tytyri limestone mine, less than an hour's drive from both the

Helsinki headquarters and Hyvinkää factory and R&D site. The Tytyri high-rise laboratory was opened in 1998, and for the first time anywhere in the world, elevators destined for buildings over 200 meters tall could be tested in action before installation.

The conditions at Tytyri are extreme: elevators have to endure dripping water, near-freezing temperatures and high humidity, meaning they are tested to withstand just about any condition a building might face. Additionally, various simulations allow testing for a range of factors, including how the human body withstands different speeds and changes in pressure during the ride.

"At the moment, the highest sensible speed for people to travel at in an elevator is 10 meters per second," says de Jong, adding that speeds of up to 17 meters per second (or over 60 km/h) can be tested at Tytyri. Human physique, however, sets limits on the feasibility of super speeds.

#### VISIONS OF A MULTI-LEVELLED FUTURE

The KONE UltraRope™ hoisting technology, introduced in June 2013, is the next big leap for the high-rise elevator industry, enabling super long elevator journeys of one kilometer in the future – twice the distance currently feasible. And as buildings grow taller, they also grow smarter. Already, a group of high-rise elevators can contain a huge amount of software, with elevators communicating with each other to optimize routes and minimize waiting.

De Jong sees digitalization as a major driving force for the future development of cities, buildings and elevators. "What this will mean is completely unknown. But we need to be ready." ■



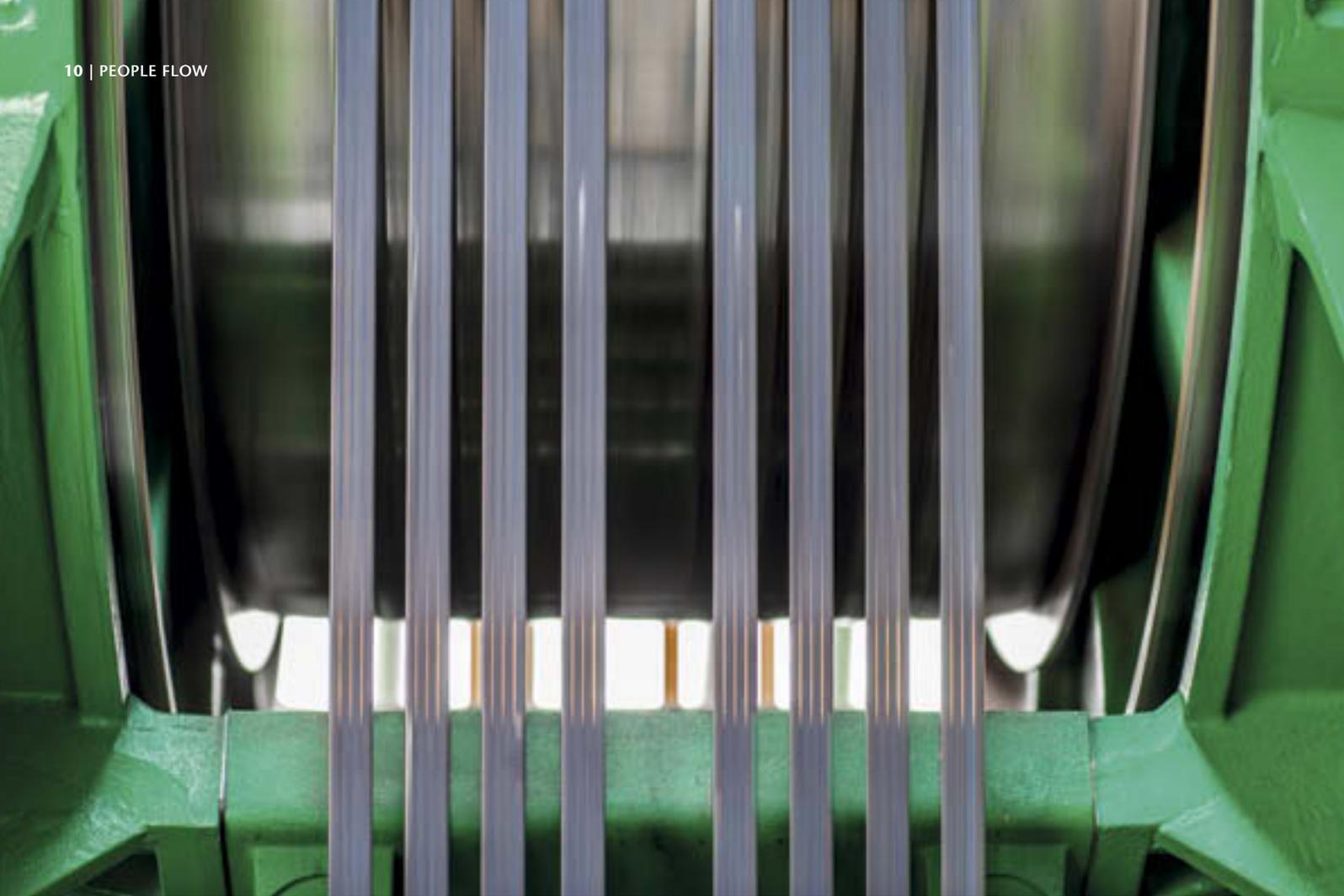
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#### KONE HIGH-RISE FAST FACTS

- Fastest commercially installed KONE elevator speed: 9m/s, Q1 Tower, Gold Coast, Australia
- Tallest elevator test shaft: 350 m, Tytyri, Lohja, Finland
- Longest continuous KONE elevator journey: 452 m, Chongqing International Trade and Commerce Center, Chongqing, China (due to open in 2017)
- Tallest KONE reference building: Makkah Clock Royal Tower Hotel, Mecca, Saudi Arabia (601 m)

He envisions sky corridors connecting mega high-rises and elevators that serve as cars in the sky, moving not just vertically but in all directions in shafts that house several elevators at a time, not just one.

"It's perhaps not the complete future vision, but I believe this is the future." ■



# KONE SHOWS THE ROPES

Traveling a kilometer is no huge feat – unless you want to make the journey upwards in a single elevator ride. No elevator manufacturer has figured out how to do this. Until now. The KONE UltraRope™ is a revolutionary technology set to break high-rise elevator limits.

TEXT LAURA VINHA PHOTO AND ILLUSTRATION KONE

**A**t first glance it doesn't look like much – a flat piece of black licorice, perhaps. But the super-light KONE UltraRope is a completely new take on elevator hoisting. Made of a carbon fiber core surrounded by a unique high-friction coating, the new rope weighs only about 19 percent of a similar strength conventional steel rope.

"You wouldn't think it, but rope weight impacts everything," says **Tomio Pihkala**, who heads one of KONE's global research and development units in Hyvinkää, Finland. "If you have a lighter rope, you can have a smaller and lighter elevator counterweight and sling. This means the overall moving masses are reduced."

Put simply, the new technology enables massive cuts in the deadweight

that is moved up or down every time someone hops into a high-rise elevator. Less deadweight means smaller energy consumption and operating costs.

"When components are smaller, the logistics are easier," says Pihkala, adding that installing huge components inside relatively cramped skyscrapers is always a challenge. "The environmental impact is also smaller when materials are lighter."

*KONE UltraRope™ in action, being tested at the Tytyri high-rise laboratory in Lohja, Finland.*

# 1 km

KONE ULTRAROPETM WILL ENABLE ELEVATOR TRAVEL OF UP TO ONE KILOMETER IN THE FUTURE.

## REINVENTING THE ELEVATOR

Traveling more than 500 meters, or 100-odd floors, in a continuous elevator trip is challenging and doesn't really make sense using conventional technology. At that point, the weight of the several kilometers of rope needed to hoist the elevator becomes an obstacle. More ropes are needed just to lift the weight of the ropes.

In a building this tall, the moving masses of a single elevator hoisted with steel ropes can be some 27,000 kilograms. This is equal to fitting ten off-road vehicles inside the shaft and shifting them along with the elevator. Using KONE UltraRope for hoisting in a similar shaft, the moving masses are roughly 13,000 kilograms, or about the weight of four off-road vehicles.

Limits set by ropes are a major reason why most very tall buildings have sky lobbies served by shuttle elevators from the ground. Separate elevators take people higher from these lobbies in the sky. In the future, KONE UltraRope will enable elevator travel all the way from ground floor to penthouse in a kilometer-high building in one continuous journey.

"We are on the brink of something big. In a sense, we have reinvented the high-rise elevator," says Pihkala.

KONE UltraRope is compatible with all other KONE high-rise solutions so it can be used to replace conventional ropes in old buildings. And with the new technology, the higher you go, the bigger the benefits. For example, the energy savings for a 500-meter elevator journey are around 15 percent versus conventional rope. For an 800-meter journey, the savings are over 40 percent.

## CORE STRENGTH

In addition to being very light, carbon fiber is strong and durable. It has already revolutionized products in several other industries, including aviation and sporting equipment.

At KONE, the idea of creating a carbon fiber rope came in 2004. "The first prototypes were made by hand," says Pihkala. Actual research and development began a few years later. It wasn't long before the rope was fitted into a shaft at KONE's Tytyri high-rise testing laboratory in Southern Finland.

"We were surprised by how problem-free it was," says Pihkala. "Often, there are a lot of problems when you develop something completely new. But our faith in this started to grow very quickly."

The rope has since been tested thoroughly both in real elevators and in laboratories. Properties like tensile strength, bending lifetime, material aging and the impact of extreme temperatures and humidity are just

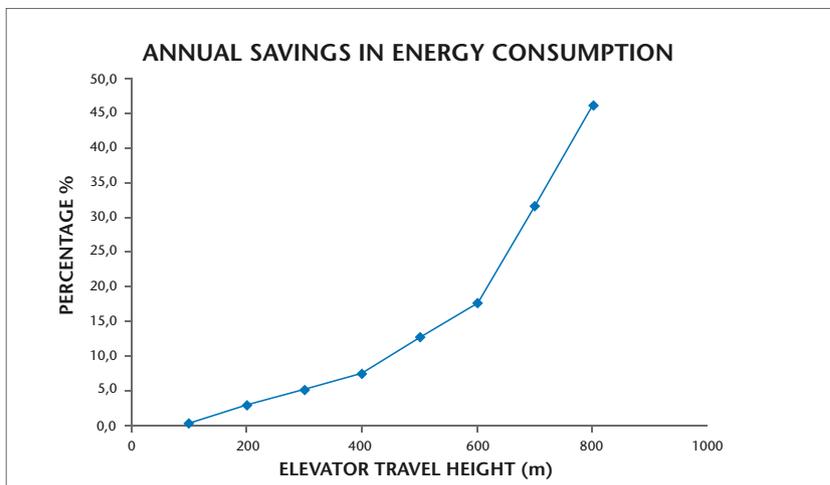
some of the qualities that have been measured.

## NO RUST, NO WEAR

Unlike steel, carbon fiber does not rust, stretch or wear. The special coating of the new rope makes lubrication unnecessary, meaning environmentally friendlier maintenance. Carbon fiber also resonates at a completely different frequency to most building materials. This means KONE UltraRope is less sensitive to building sway, and elevator downtime during strong winds and storms can be reduced.

While typical high-rise elevator ropes need to be changed at regular intervals – no easy task in a tall building – the new technology enables a rope lifetime twice that of conventional ropes. KONE has also developed a real-time rope condition monitoring system.

"We have a rope that works, is reliable, and delivers on our promises," Pihkala beams. "This is a good place to move on from." ■



# SUSTAINABLE URBAN RENEWAL

URBAN TRENDS

## SINGAPORE SECRETS

Underground restaurants are on trend at the moment. As Singapore swells with bigger and grander establishments, secret eateries are increasingly popping up to serve culinary delights with a not-so-typical social experience.

The phenomenon started with people who wanted to explore new tastes and meet like-minded foodies outside a commercial setting.

Local venues boast hush-hush menus, authentic home-style cuisine and hidden entrances. But unless you have insider information, you may never get in. On the upside, you can usually get the password off a Facebook or Twitter page.

Shh! Don't tell anyone we told you!



# 35

REGENERATIVE DRIVES REDUCE UP TO 35% OF AN ELEVATOR'S TOTAL ENERGY CONSUMPTION BY SUPPLYING THE REGENERATED ELECTRICITY BACK TO THE BUILDING'S POWER NETWORK.

## KONE SOLUTIONS

31 KONE MiniSpace™ elevators  
 21 KONE MonoSpace® elevators,  
 of which 3 are scenic  
 16 KONE TravelMaster™ escalators  
 5 KONE TransitMaster™ escalators  
 5 small home elevators for penthouse  
 apartments  
 KONE Polaris™ hybrid destination  
 control system

## SOUTH BEACH ECO-QUARTER

Total area: 150,000 m<sup>2</sup>  
 Floors: 45 stories tower 1; 34 stories tower 2  
 Rooms: 650+ rooms  
 Architects: Foster + Partners  
 Developer: City Developments Limited and  
 IOI Group  
 Interior design: Philippe Starck

TEXT SIO HUI LIM

**S**ingapore is on the rise, quite literally. A recent construction boom has left the city with iconic landmarks.

Come 2015, Singapore will have another architectural masterpiece to its name, South Beach. The 3.5 hectare complex includes the conservation of a former colonial army compound, which will be transformed into a lifestyle destination with office, hotel, retail, club and residential components.

The groundbreaking mixed-use development designed by British architects Foster + Partners will incorporate comprehensive eco-friendly features, such as an environmental filter canopy that will shade the open spaces and draw air currents to cool the area beneath it,

a crucial consideration in the tropical country.

Central to the sustainable design are KONE's customized People Flow® solutions, planned to meet the needs of the various building types and user groups. KONE TransitMaster™ escalators with energy-saving standby features will be installed in the retail area to create optimal traffic flow. The towers will feature compact KONE MiniSpace™ elevators traveling at speeds of up to 8.0 meters/second, and the intelligent KONE Polaris™ hybrid destination control system to reduce waiting times. KONE MonoSpace® machine-room-less elevators, complete with regenerative drives, will also be delivered.

The eco-quarter is scheduled for completion in 2015. ■

# Living the SKY LIFE

City skylines shoot through the clouds to accommodate a growing demand for homes in the sky.

TEXT SILJA KUDEL PHOTOS JEFF TOPPING/POLARIS/MVPHOTOS

**F**rom his spacious apartment on the 68th floor of the 101-story Princess Tower in Dubai, **Alexander James** can hardly take his eyes off the spectacular view of the Dubai Marina, dubbed the “Nice of the Middle East”. Rising to 414 meters, Princess Tower is recognized by the Guinness World Records as the world’s tallest residential building.

A former suburbanite hailing from Wimbledon in the United Kingdom,

James relocated to the United Arab Emirates to pursue new career opportunities as a Sales Manager at the ITP Publishing Group – but equally to enjoy the lifestyle offered.

A recent KONE survey of people living and working in skyscrapers around the world reveals that the oil-rich Dubaians are among the keenest to brand their city with skyscrapers, with nearly 80 percent of respondents believing that landmark buildings improve the city’s image. Dubaians also

appreciate the comfort and status of living in a skyscraper.

## LOVE AT FIRST SIGHT

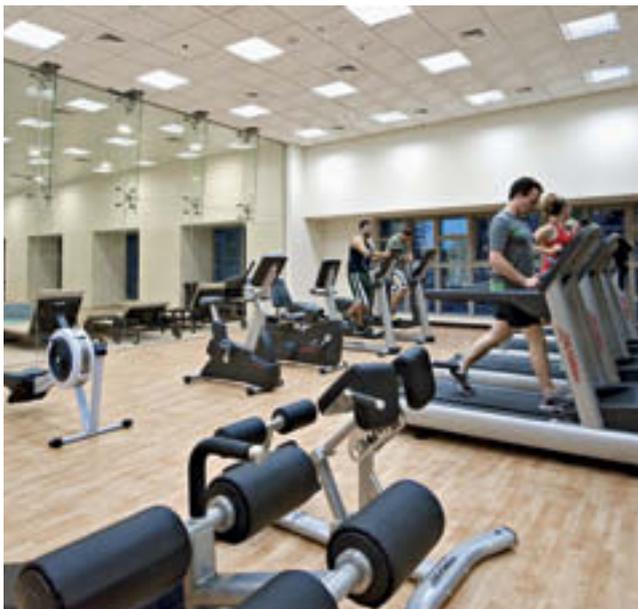
James and his newlywed wife found their apartment by chance and took it on the spot. “We both fell in love with the view – especially in the morning and evening. And it’s so peaceful living 68 floors up in the sky, far from the traffic, pollution, hustle and bustle. We plan to stay for the next five years and start a family here,” says James.

## PRINCESS TOWER

Completed: 2012  
 Height: 170,000 m<sup>2</sup>  
 Floors: 101 + 6 basement floors  
 Architect: Eng. Adnan Saffarini Office  
 Building owner: Tameer Holding Investment LLC  
 Developer: Tameer Holding Investment LLC  
 Contractor: Arabian Construction Company

## KONE SOLUTIONS

11 KONE MiniSpace™ elevators  
 2 KONE MonoSpace® elevators  
 2 KONE JumpLift construction time elevators



Like James, the majority of Dubai residents in KONE's Tall Buildings survey identify the avoidance of pollution and feeling of peace and relaxation as the main incentives for living high above ground level.

James reports that the quality of life is significantly better in Dubai than in the UK, particularly with access to luxury residential services including two state-of-the-art gyms, two pools and a Jacuzzi. In addition, there are two games rooms with pool tables and air

hockey, and a playroom for children on one of the lower floors.

"The outside pool area on the fifth floor offers a great outdoor space for residents to enjoy a breath of fresh air. We also make good use of our balcony," says James.

### BEAM ME UP

"The quality of the KONE elevators in our building is incredible. They are fast and deliver an incredibly smooth ride. You don't even notice that you've shot

## CITY DWELLERS LIKE LIVING TALL

When you think of Paris, London or Rome, what springs to mind? The Eiffel Tower? Big Ben? The Colosseum? Landmark buildings are part of a city's identity. And increasingly that identity is being driven higher as urban areas become more densely populated and the logical building direction is up.

Nearly 70 percent of people living in cities around the world see tall buildings as an essential part of the modern cityscape. Sixty-three percent believe that building upwards is a sustainable way to develop urban areas. And, perhaps unsurprisingly considering where most of the world's highest new buildings are springing up, Asians and Middle Easterners view tall buildings even more positively than Europeans and Americans.

There are other differences between nationalities too, according to the study commissioned recently by KONE and gathering responses from over 4,000 city dwellers in eight of the world's major cities: Dubai, Chicago, London, Moscow, Mumbai, Paris, Shanghai and Singapore.

Singaporeans and Parisians are the most eager to live on high floors and men are slightly more enthusiastic than women about living and working in high-rises. Three-quarters of respondents like working in tall buildings because there is generally easy access to services such as shops and public transport. People from Shanghai (79%) and Dubai (71%) in particular appreciate the close proximity to business partners offered by working in tall buildings.

And the top reasons to love living high? Nearly 90 percent of respondents mentioned the view while more than half also appreciated being able to rise above the traffic noise below.

up from the ground floor to the 68th in less than a minute. They really make living high up a pleasure."

The KONE survey indicates that Dubai residents assign special importance to advanced high-rise technology, with four out of five respondents feeling it is important to have access control solutions to improve security and enable the easy movement of people within buildings. →



### NEW HEIGHTS OF LUXURY

Sipping green tea in the living room of her 27th floor penthouse, **Pauliina Louhiluoto** enjoys a panoramic view of Shanghai's Luwan and Xuhui districts. Buzzing with energy, the noisy streets below are populated by boutiques, bakeries and spas, yet the traffic is inaudible.

"We occasionally hear car horns, fireworks or dogs barking, but never traffic. And we love listening to the window cleaners singing on their suspended platforms," says Louhiluoto, CEO of Helsinki-based fashion and design firm My o My.

She and her family relocated to Shanghai last year due to her husband's posting in China.

### SO LONG, SUBURBIA

Shanghai is a city ambitiously pushing skyward. According to the KONE

survey, four out of five Shanghaiese regard tall buildings as a vital part of their cityscape. Nearly 80 percent see skyscrapers as a space-efficient form of urban development. Similar results apply globally, with two out of three metropolitans reporting positive or very positive attitudes toward tall buildings.

Whereas most foreigners in Shanghai choose quiet expatriate compounds, Louhiluoto fell in love with the energetic Puxi neighborhood – an unconventional choice for an ex-suburban family with three kids.

"I honestly don't miss the suburbs! The kids miss playing football in the backyard, but there's a tennis court and outdoor pool right here in our building."

Louhiluoto often retreats to her rooftop garden, a restful oasis where she reconnects with nature. "In a

high-rise, you really sense the weather changing. It's fascinating to see the clouds rolling in. The view is most breathtaking by night – the light shows on buildings are amazing."

### A SLICE OF HEAVEN

For Louhiluoto, the main perk of high-rise living is being in the heart of a bustling metropolis far removed from the noise and commotion.

"I have my own little world up here. We don't see the cars or people in the streets, but we can sense the local culture around us," she says.

The same feelings are reported by the majority of respondents in KONE's Tall Buildings survey. The top three reasons people gave for choosing a high-rise were the scenery (88 percent), absence of traffic and other noise (60 percent) and privacy (47 percent).

## THE LUNGS OF SINGAPORE

Every second Singaporean wants to live high up in a tall building, yet within easy reach of nature. This is no longer an impossible equation thanks to Gardens by the Bay, a 101-hectare park built on reclaimed land flanking the skyscrapers of downtown Singapore. Opened in 2012, this science fiction paradise enhances quality of life for Singaporeans by “greening” the city and significantly increasing outdoor recreational space. Designed by British Grant Associates, the iconic landmark includes a grove of “supertrees” stretching as high as 50 meters. These towering steel structures covered with ferns, orchids and other vegetation have a unique ecological function: they collect rainwater, generate solar energy, and function as part of the park’s cooling system.



## AT YOUR SERVICE

Long waiting times for elevators are among the major drawbacks of “living tall” reported by 31 percent of respondents. The growing need among high-rise dwellers for speed and convenience is being addressed by rapid advances in high-rise elevator technology. KONE is at the forefront in delivering comfort-enhancing solutions such as super-fast double-deck elevators and intelligent access control systems that automatically identify passengers and take them directly to their own floor.

High-rise living has brought pleasant surprises for the Louhiluoto family: the youngest son learned to count with the help of elevator buttons!

James agrees, “Life at the top is astounding. I’d recommend Princess Tower to anyone wanting state-of-the-art living and exceptional residential facilities.” ■

## GARDEN-TO-TABLE

The Savoy, located in KONE’s hometown of Helsinki, Finland, offers a locally grown “menu” on a small scale. The Alvar Aalto designed gourmet restaurant grows more than 40 species of herbs and a variety of salad greens on its rooftop terrace during the summer. Nearly 200,000 bees also earn their keep – the nectar is believed to be collected from 30 flower species.



## LONDON'S NEW GREEN

Next year will see the opening of a new green space designed to draw visitors, enhance livability and build a sense of communal identity for London’s Southbank. Conceived as a “people magnet” and green connector in the new Embassy Gardens housing development, Linear Park is strongly inspired by New York’s High Line, a public park built on an elevated freight rail on Manhattan’s West Side. Linear Park will meander from Vauxhall to Battersea Power Station, striving to emulate the success of the High Line as an inspiring example of urban regeneration.

# PEOPLE FLOW like no other

What does it take to provide a complete People Flow® solution like no other for one of the largest structures in the world?

A specially recruited design and project team, numerous complicated calculations – and a mountain of equipment.

TEXT JOHN ACHER PHOTOS KONE

## MAKKAH CLOCK ROYAL TOWER HOTEL

Completed: 2012

CLOCK TOWER:

Height: 601 m

Floors: 120

PODIUM:

Height: 115 m

Floors: 15

Architect: Dar al-Handasah Shair & Partners

Developer: Saudi Binladin Group

## KONE SOLUTIONS

CLOCK TOWER:

89 KONE MiniSpace™ elevators

5 KONE MonoSpace® Special elevators

16 KONE extra heavy-duty,  
high-efficiency Transvario escalators

PODIUM:

75 KONE MiniSpace™ elevators

4 KONE MonoSpace® Special elevators

111 KONE extra heavy-duty, high-efficiency  
Transvario escalators

ADJACENT TOWERS:

10 KONE MiniSpace™ elevators

2 Helipad elevators

6 KONE extra heavy-duty, high-efficiency  
Transvario escalators



## KONE IN THE MIDDLE EAST

KONE established its regional headquarters in Dubai in 1993, and has become the leading supplier of elevators and escalators in the Middle East, employing nearly 2,000 people across Saudi Arabia, the United Arab Emirates, Qatar, Oman and Bahrain. It serves a further 10 countries in the region through its network of joint-ventures and authorized distributors. KONE has about 750 employees in Saudi Arabia where it operates through the KONE-Areeco Ltd joint-venture.

**T**he Makkah Clock Royal Tower Hotel rises above everything else in the city of Mecca in Saudi Arabia. At 601 meters and 120 floors, the glistening steel-and-concrete clock tower is the biggest building in the world, and ranks second in height only to the Burj Khalifa in Dubai in the neighboring United Arab Emirates. The structure's seven towers rest upon a 15-story retail podium, and the three towers on either side of the clock tower reach between 200 and 300 meters into the sky.

At peak times the hotel, which faces the world's biggest mosque, the Masjid al-Haram or Grand Mosque, provides accommodation and recreation for up to 75,000 visitors at a time – that's equal to the capacity of the Olympic Stadium in Berlin, Germany. All of these thousands of people leave their rooms on various floors of the Makkah Clock Royal Tower Hotel within 30 minutes or less for prayer five times per day. For KONE, supplying a comprehensive solution for this megatall high-rise has been one of its most impressive undertakings and serves as a prestigious calling card, further strengthening its position in the Middle East high-rise market.

## FACILITATING THE MOVEMENT OF PEOPLE

KONE was contracted to supply elevators and escalators for the building's podium in 2002. In 2008, after making numerous calculations to establish the best possible solutions to serve the building's unique and massive flows of people, the company received an order to supply equipment for the clock tower itself. Altogether, KONE has delivered more than 300 elevators and escalators for the entire complex.

KONE pulled top-notch experts from across the company to work side-by-side with the contractor and building owner, the Saudi Binladin Group (SBG), to ensure elevator and escalator capacity and placement were optimal for enabling a smooth exit and re-entry for building visitors.

"We conducted a thorough people flow analysis to learn and track possible passenger traffic patterns," says **Tarek Elnaggar**, Senior Vice President at KONE who was the regional director for KONE Middle East during the project. "By doing so, we delivered an extraordinary amount of equipment, including 94 elevators and 16 escalators for the clock tower."



KONE worked closely with the architects and contractors in the pre-planning stages, calculating traffic capacity to assess crowd behavior and patterns of movement. Allocation of sufficient escalators, elevators, and dedicated routes minimizes congestion and the risks related to moving such large crowds through the complex.

The elevators ascend to the summit of the clock tower in stages, one set rising as high as the 86th floor while another set whisks passengers up to the top floors, including luxurious hotel apartments and an astronomical



observation deck situated in a beautiful glass dome above the clock.

To accommodate such unique flows of people, KONE implemented special group control software with state-of-the-art intelligence. The control system minimizes waiting times and takes passengers most conveniently and with fewest stops to their designated floor.

The elevators in the clock tower travel at up to six meters per second – or about two floors per second. They include some of the largest elevators available, with up to eight tons of capacity in a few podium shuttles, and up to 4.5 tons of capacity – room for

54 people at a time – in the biggest shuttle in the clock tower. The longest continuous elevator trip within the complex is 393 meters.

#### **MAINTENANCE LIKE NO OTHER**

“The main part of the project has been completed and handed over to the customer, with just a few units still to be commissioned,” says Elnaggar. “The challenge now turns to maintenance.”

For the Makkah Clock Royal Tower Hotel that means keeping a team of KONE service technicians permanently on site to provide 24-hour service and

ensure the elevators and escalators perform reliably and are repaired immediately if a fault occurs. “We work in shifts with 15 technicians on duty per shift,” explains KONE’s **Ahmed Ragab**, Project Manager for the site.

KONE considers the clock tower project an example of the company’s competence to deliver elevators and escalators to many of the world’s tallest and exceptional skyscrapers.

“This is a trademark reference for KONE in Saudi Arabia, and we are very proud to partner with SBG,” Elnaggar says. ■

# THE SKY'S THE LIMIT

**W**hen famous ape King Kong climbed the 102-story Empire State Building in 1933, little did we know that would set the stage for all things tall.

Actually, the term skyscraper came about in 1884 when the first tall building was constructed in the United States. The Home Insurance Building in Chicago, Illinois, United States, is considered the father of skyscrapers. Standing at 42 meters and 10 stories, it was the first

building to employ a supporting skeleton of steel beams and columns.

Today, the Home Insurance Building doesn't stand a chance in the tall category.

Sixty-six buildings taller than 200 meters were completed during 2012.

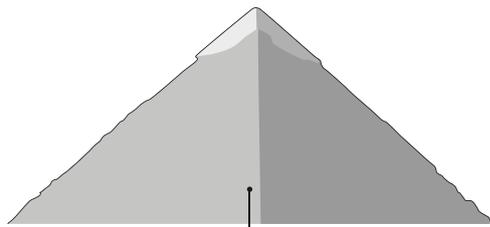
Of the 10 tallest completed last year, KONE provided People Flow® solutions to four: the Makkah Clock Royal Tower Hotel in Saudi Arabia, Princess Tower and the Elite Residence both in the United Arab Emirates, and Leatop Plaza in China.

## HISTORICAL HIGHS

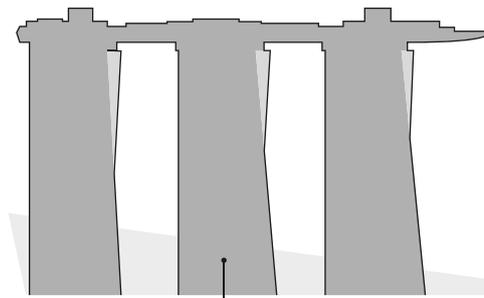
The Empire State Building (381 meters) held the title of tallest building in the world for an unprecedented 41 years, from 1931 to 1972. Before the start of the 20th century the tallest buildings in the world were Europe's churches and cathedrals. And before that, we can count the Great Pyramid a skyscraper for that era. At original build, it stood at 146.5 meters. ■

## What defines tall?

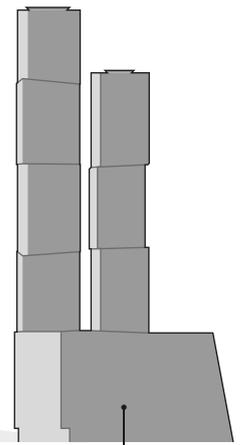
There is no absolute definition of what constitutes a tall building though it is generally recognized as a building of 14 or more stories, or over 50 meters in height.



Great Pyramid of Giza  
146.5 m, Giza Necropolis



Marina Bay Sands  
194 m, Singapore



Capital City Towers  
302 m, Moscow



## TALL TESTING

There's no tower poking out of the landscape at KONE's high-rise elevator laboratory site in Lohja, Finland. So where is the world's tallest elevator test shaft? Deep underground – well below sea-level, in fact.

The Tytyri test site was opened in 1998, adjacent to a limestone mine that has operated there for over 100 years. It remains the only elevator testing facility where travel distances exceeding 200 meters can be tested in action. The shaft itself is 350 meters long, enabling a travel distance of 317 meters.

The maximum speed that can be tested at Tytyri is a whopping 17 m/s – that's equal to whizzing past four floors in just one second. ■

We can likely expect the world's first kilometer-tall building as well as the completion of at least eight megatalls by 2020. That's double the height of a supertall!

A Megatall building is over 600 meters in height

2

MEGATALL BUILDINGS IN THE WORLD

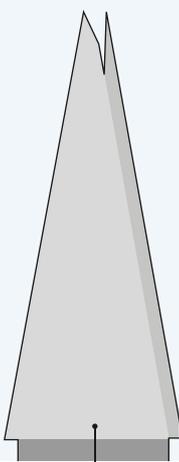
A Supertall building is over 300 meters in height

71

SUPERTALL BUILDINGS IN THE WORLD

2788

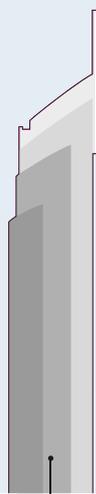
150+ METER BUILDINGS IN THE WORLD



The Shard  
306 m, London

770

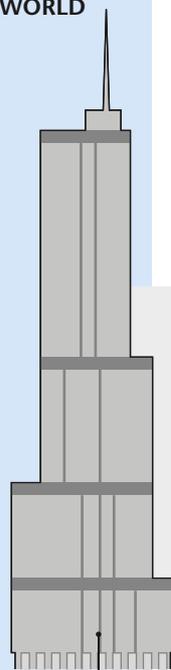
200+ METER BUILDINGS IN THE WORLD



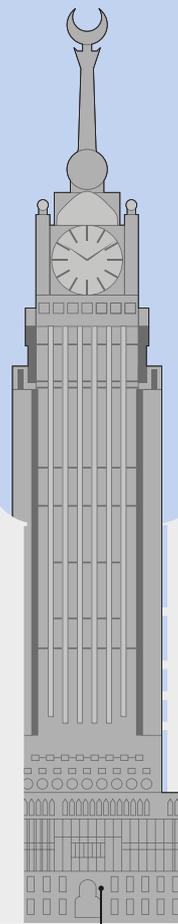
Q1 Tower  
323 m,  
Gold Coast



Princess Tower  
413 m, Dubai



Trump International  
Hotel & Tower  
423 m, Chicago



Makkah Royal  
Clock Tower Hotel  
601 m, Mecca

Dedicated to People Flow™



## KONE UltraRope™ – one innovation serving many high-rise elevator needs.

The superlight KONE UltraRope enables unrivaled eco-efficiency, reliability, and durability, improving overall high-rise elevator performance.

KONE UltraRope is clearly more energy efficient than conventional technologies. It has twice the lifetime of conventional steel rope and is also less sensitive to building sway. Its lightweight carbon fiber core cuts elevator moving masses significantly and makes travel heights of 1,000 meters possible in the future.

[www.kone.com](http://www.kone.com)

### Total moving masses

