



Architecture

21055
Burj Khalifa
Dubai, United Arab Emirates



Burj Khalifa

Described as both a 'Vertical City' and 'A Living Wonder', Burj Khalifa, at the heart of downtown Dubai, is also the world's tallest building.

Developed by Dubai-based Emaar Properties PJSC, Burj Khalifa rises gracefully from the desert and honors the city with its extraordinary union of art, engineering and meticulous craftsmanship.

At 2,716.5 ft. (828 m), the equivalent of a 200-story building, Burj Khalifa has 160 habitable levels, the most of any building in the world. The tower was inaugurated on January 4, 2010, to coincide with the fourth anniversary of the Accession Day of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai.

Arguably the world's most interesting construction project, Burj Khalifa is responsible for a number of world firsts. The tower became the world's tallest man-made structure just 1,325 days after excavation work started in January 2004.



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Burj Khalifa utilized a record-breaking 430,000 cubic yds. (330,000 m³) of concrete; 42,990 tons (39,000 metric tons) of steel reinforcement; 1.1 million sq. ft. (103,000 m²) of glass; and 167,000 sq. ft. (15,500 m²) of embossed stainless steel. The tower took 22 million man-hours to build.

With a total built-up area of 5.67 million sq. ft. (526,000 m²), Burj Khalifa features 1.85 million sq. ft. (170,000 m²) of residential space, over 300,000 sq. ft. (28,000 m²) of office space, with the remaining area occupied by a luxury hotel. In 2003, as a result of an international design



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competition, Skidmore, Owings & Merrill LLP (SOM) was selected from a group of five international competitors to carry out the architecture and engineering of the Burj Khalifa.

With famous architecture in the Haj Terminal at Jeddah Airport and National Commercial Bank, SOM is no stranger to Middle Eastern design. SOM incorporated patterns and elements from traditional Islamic architecture, but the most inspiring muse was a regional desert flower, the Hymenocallis, whose harmonious structure is one of the organizing principles of the tower's design. Three 'petals' are arranged in a triangular

shape and unified at the center, and instead of repeated identical patterns, the architectural plan appoints successively receding and rotated stories.

The Y-shaped plan is ideal for residential and hotel usage, with the wings allowing maximum outward views and inward natural light. Viewed from above or from the base, the tips of the Y-shaped plan evoke the onion domes of Islamic architecture. During the design process, engineers rotated the building 120 degrees from its original layout to reduce stress from prevailing winds.

Architecturally, the building transforms itself from a solid base expression to a vertically expressed middle section of polished stainless steel, projected metal fins, and glass. Only vertical elements were used here, as the fine dust in Dubai's air would build up on any horizontal projecting elements.

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DESERT FLOWER

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DOME SHAPE

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The Architects

With the design and engineering of Burj Khalifa, Skidmore, Owings & Merrill LLP (SOM) joined forces with Dubai-based developers Emaar Properties PJSC, to redefine what was possible with supertall buildings.

With a portfolio that includes some of the most important architectural accomplishments of the 20th and 21st centuries, including the John Hancock Center and Willis (formerly Sears) Tower, SOM was perfectly placed to carry out this challenging task.

To create Burj Khalifa—a building that shatters all previous height records at 2,716.5 ft. (828 m)—a team of more than 90 designers and engineers combined cutting edge technology and culturally-influenced design to create a global icon that will serve as a model for future urban centers.



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Construction Highlights

Burj Khalifa is truly the product of international collaboration; over 60 consultants including 30 on-site contracting companies from around the world were involved in the project.

At the peak of construction, over 12,000 professionals and skilled workers from more than 100 countries were on site every day. The world's fastest high-capacity construction hoists, with a speed of up to 6.5 ft./sec (2 m/sec or 120 m/min), were used to move men and materials.

Over 1.59 million cubic ft. (45,000 m³) of concrete, weighing more than 121,254 tons (110,000 metric tons), were used to construct the concrete and steel foundations, which feature 192 piles, buried more than 164 ft. (50 m) deep. Burj Khalifa employs a record-breaking 11.6 million cubic ft. (330,000 m³) of concrete; 42,990 tons (39,000 metric tons) of reinforced steel; 1.1 million sq. ft. (103,000 m²) of glass; 166,800 sq. ft. (15,500 m²) of embossed stainless steel; and the tower took 22 million man-hours to build. The amount of reinforced steel used at the tower would, if laid end to end, extend over a quarter of the way around the world. The concrete used is equivalent to a sidewalk 1,200 miles (1,900 km) in length, and the weight of 110,000 elephants. The weight of the empty building is 551,156 tons (500,000 metric tons).



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The tower accomplished a world record for the highest installation of an aluminum and glass facade, at a height of 1,679.8 ft. (512 m). The total weight of aluminum used on Burj Khalifa is equivalent to that of 5 A380 aircraft, and the total length of stainless steel 'bull nose' fins is 293 times the height of the Eiffel Tower in Paris.

Facts about Burj Khalifa

Location:..... Downtown Dubai, Dubai, United Arab Emirates

Architect: Skidmore, Owings & Merrill LLP (SOM)

Building type: Supertall skyscraper

Materials:..... Reflective glazing, aluminum
and textured stainless steel

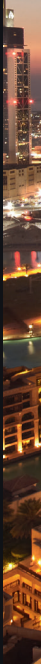
Construction:..... Reinforced concrete and steel

Date: From 2004 to 2010

Floor area: 5.67 million sq. ft. (464,511 m²)

Height: 2,716.5 ft. (828 m)

Stories:..... 160+ stories







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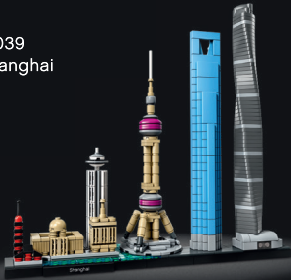
21030
United States Capitol Building

21042
Statue of Liberty

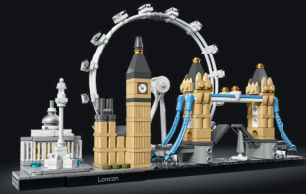


and collect all the models

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The interior is inspired by local culture while staying mindful of the building's status as a global icon and residence. The design features glass, stainless steel and polished dark stones, together with silver travertine flooring, Venetian stucco walls, handmade rugs and stone flooring.



Over 26,000 glass panels were used in the exterior cladding of Burj Khalifa. Over 300 cladding specialists from China were brought in for the cladding work on the tower.

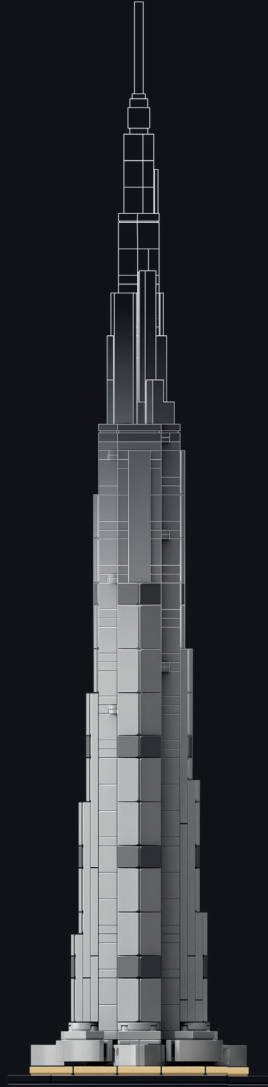


The opening ceremony of Burj Khalifa featured a display of 10,000 fireworks, light beams and further sound, light and water effects. Using 868 powerful stroboscope lights that are integrated into the façade and spire, different lighting sequences were choreographed, together with more than 50 different combinations of the other effects.



It will take 36 workers 3 to 4 months to clean the entire exterior façade using all building maintenance units.

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