Shanghai World Financial Center

Facts

Official Name: Shanghai World Financial Center
Other Names: SWFC
Structure Type: Building
Status: Completed
Country: China
City: Shanghai
Street Address & Map: No.100, Century Avenue, Pudong New Area
Postal Code: 200120
Building Function: hotel / office
Structural Material: composite
  - Core: Reinforced Concrete
  - Columns: Concrete Encased Steel
  - Floor Spanning: Steel

Height: To Tip
494.3 m / 1,622 ft
Height: Architectural
492 m / 1,614 ft
Height: Occupied
474 m / 1,555 ft

Height: Observatory
474 m / 1,555 ft
Floors Above Ground
101
Floors Below Ground
3
# of Elevators
91
Top Elevator Speed
10 m/s
Tower GFA
381,600 m² / 4,107,508 ft²
# of Parking Spaces
1,100

Companies Involved

Owner: Shanghai World Financial Center Co., Ltd.
Developer: Mori Building
Architect
  - Design: Kohn Pedersen Fox Associates; Mori Building; Irie Miyake Architects and Engineers
  - Architect of Record: East China Architectural Design & Research Institute; Shanghai Modern Architectural Design Company
Structural Engineer
  - Design: Leslie E. Robertson Associates
MEP Engineer
  - Design: Kenchiku Setsubi Sekkei Kenkyusho
Main Contractor
  - China State Construction Engineering Corporation; Shanghai Construction Group
Other Consultant
  - Façade: ALT Limited; Permasteelsia Group
  - Fire: Rolf Jensen & Associates
  - Marketing: CBRE
  - Quantity Surveyor: Langdon & Seah
  - Wind: Alan G. Davenport Wind Engineering Group
  - (not specified): AECOM
Material Supplier
  - Cladding: HALFEN
  - Elevator: Hitachi, Ltd.; Otis Elevator Company; thyssenkrupp; Toshiba Elevator and Building Systems Corporation (TELC)
  - Façade Maintenance Equipment: CoxGomyl

Proposed: 1994
Construction Start: 1997
Completion: 2008
Official Website: Shanghai World Financial Center

Rankings
  - Click arrows to view the next taller/shorter buildings

Global Ranking: #10 Tallest in the World
Regional Ranking: #7 Tallest in Asia
National Ranking: #5 Tallest in China
City Ranking: #2 Tallest in Shanghai
About Shanghai World Financial Center

The Shanghai World Financial Center is a symbol of commerce and culture that speaks to the city’s emergence as a global capital. Located in Shanghai’s Pudong District, the mixed-used Shanghai World Financial Center is a vertical city, containing 62 office floors, conference facilities, urban retail and dining spaces, and a 174-room five-star Park Hyatt Hotel at the top—the world’s highest hotel from the 79th to 93rd floors. Above the hotel, at the 94th to 100th floors, is a visitors’ square and observatory.

Shaped by the intersection of two sweeping arcs and a square prism—shapes representing ancient Chinese symbols of heaven and earth, respectively—the tower’s tapering form supports programmatic efficiencies, from large floor plates at its base for offices to rectilinear floors near the top for hotel rooms. Its boldest feature, the 164-foot-wide portal carved through its upper levels relieves the enormous wind pressures on the building. The project activates the ground plane through function-specific entrance volumes (e.g., hotel, office and retail) that extend from its stone-clad base. To further connect the activities of the building to the city, the retail volume is oriented toward a public park planned for an adjacent site.

Optimizing form and function was paramount to the design, integrating the structure, mechanical systems, and exterior envelope in a modular system that repeats every 13 floors to facilitate the fabrication and installation of components, and, in turn, reduce construction time, material waste, and structural inefficiencies. The purity of the tower’s design belies the inherent complexity of the various building systems within, and is readily adaptable to the changing programmatic requirements that often arise during the long timeline of such a large project, as well as to the changing needs of building users.

The project was put on hold in 1995 after the completion of the foundations. When revived in 1999 the height and base dimensions were both increased from the original design. Reinforcing the existing piles to accommodate these changes would have been possible but costly. The new, taller structure would not only have to be made lighter, but would need to resist higher wind loads, which increase exponentially with height.

The project’s structural engineer developed a new system, employing composite mega-columns, diagonal mega-braces, steel out-riggers, belt trusses, and core wall trusses, the pile loads were redistributed to accept increased lateral loads from wind and earthquake. The stiffness of the lateral force-resisting system of the perimeter wall was increased, and as such, the original design for the perimeter framing was abandoned in favor of a diagonal-braced frame with added outrigger trusses coupled to the columns of the mega-structure. This enabled the weight of the building to be reduced by more than 10% and resulted in a reduced cost for the structure, provided for speedier construction, and significantly reduced the material that went into the building and thus made the building even more environmentally friendly.

Shanghai World Financial Center

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Videos

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16 Aug 2018 – William Pedersen, Kohn Pedersen Fox Associates

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Research Papers

The Global Tall Building Picture: Impact of 2018
Jan 2019 – CTBUH Journal 2019 Issue I

Developments of Structural Systems Toward Mile-High Towers
1 Sep 2018 – International Journal of High-rise Buildings Volume 7 Number 3

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