Pearl River Tower

**Facts**

- **Official Name**: Pearl River Tower
- **Structure Type**: Building
- **Status**: Completed
- **Country**: China
- **City**: Guangzhou
- **Street Address & Map**: 15 Zhujiang Xi Road, Junction between Zhujiang Xi Road and jinsui Road, Tianhe District
- **Postal Code**: 510610
- **Building Function**: Office
- **Structural Material**: Composite
  - Core: Reinforced Concrete
  - Columns: Concrete Encased Steel
  - Floor Spanning: Steel
- **Proposed**: 2005
- **Construction Start**: 2006
- **Completion**: 2013

**Rankings**

- **Global Ranking**: #110 Tallest in the World
- **Regional Ranking**: #65 Tallest in Asia
- **National Ranking**: #54 Tallest in China
- **City Ranking**: #7 Tallest in Guangzhou

**Companies Involved**

- **Owner/Developer**: The Guangzhou Pearl River Tower Properties
- **Architect**: Skidmore, Owings & Merrill LLP
- **Architect of Record**: Guangzhou Design Institute
- **Structural Engineer**: Skidmore, Owings & Merrill LLP
- **MEP Engineer**: Skidmore, Owings & Merrill LLP
- **Main Contractor**: Shanghai Construction Group
- **Other Consultant**:
  - Acoustics: Shen Milsom Wilke, Inc.
  - Façade: Meinhardt
  - Fire: Rolf Jensen & Associates
  - Landscape: SWA Group
  - Vertical Transportation: Fortune Shepler Consulting
  - Wind: RWDI
- **Material Supplier**:
  - Cladding: Jangho Group Co., Ltd.
  - Elevator: Otis Elevator Company
  - Façade Maintenance Equipment: CoxGomyl
  - Paint/Coating: Jotun; AkzoNobel
  - Sealants: Dow Corning Corporation

**About Pearl River Tower**

Using some of the most sophisticated technologies currently available, the designers of Pearl River Tower created a highly integrated structure that derives its efficiencies by applying previously tested solutions in a combination never before accomplished at such a large height. The tower stands as a testament to innovative design and sustainable construction practices, setting new standards for future high-rise developments.
It was important to both the client and the design team that a holistic approach be used, so as to avoid an array of solutions that might be conceptually compelling, but would not survive the rigors of design development and future value-engineering exercises. This demanded a design approach that was not form-driven, but performance-based, with all systems having a degree of interdependency.

Thus, the building has been carefully shaped to use natural forces to maximize its energy efficiency. The tower's sculpted body directs wind to a pair of openings at its mechanical floors, pushing turbines that generate energy for the building. East and west elevations are straight, while the south façade is concave; the north façade is convex. The south side of the building is dramatically sculpted to direct wind through the four openings, two at each mechanical level.

The building's siting and evocative curving shape work together to drive performance. Its generally rectangular floor plate has been shifted slightly from Guangzhou's orthogonal grid in order to maximize use of prevailing breezes, and to better capture the sun's energy through the strategic location of photovoltaics.

The tower's shading system uses automated, daylight-responsive blinds set within the building's double-skin façade, thereby reducing the building management's operational needs. Its ventilation/dehumidification system uses heat collected from the double-skin façade as an energy source. The integrated façade assembly provides very good thermal performance, as well a high level of natural daylight to the space. Low-energy, high-efficiency lighting systems use radiant panel geometry to assist in the distribution of light. The double-skin façade also allows greater flexibility in the layout of office space, as it reduces the amount of internal mechanical chases required for ventilation, heating and cooling.

The tower's mechanical design approach also allowed architects to reduce the building's floor-to-floor height from 4.2 meters to 3.9 meters, reducing the number of constructed stories by five. Occupants can be comfortably positioned close to perimeter walls. The radiant cooling, chilled ceiling and decoupled ventilation system provides improved human thermal comfort, efficient heat exchange, and improved office acoustics. The ventilation system is delivered via a raised access floor, providing improved indoor air quality and air change effectiveness. There is also a reduced cost of tenant fit-out and future retrofits due to the absence of fan coils, VAV boxes, filters, ductwork, insulation, and other items typically requiring tenant-specific alterations.

While it is the combination of performance-driven curving shape and exposed vertical-axis wind turbines that fuse Pearl River Tower into the public perception of the Guangzhou skyline, its most significant impact is drawn from the level of integration between sustainable design elements. The combination of turbines, shading systems, a double-skin façade with energy-efficient lighting, ventilation, and mechanical design all work together complementarily, resulting in a substantial decrease in the amount of electrical power required to operate the building's HVAC and lighting systems. Full implementation of Pearl River Tower’s sustainable strategies will result in an overall energy savings of approximately 30 percent as compared to a conventionally designed building of the same scale, constructed to conform to the Chinese baseline energy code.

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