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China Zun: Beijing's New Icon, 2018's Tallest

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Wuren Wang is vice chairman and general manager of CITIC Heye Investment Co., Ltd. He is an engineering expert, and has been awarded a Special Government Allowance from the State Council of China. He is also a Grade I-certified constructor, professorate senior engineer, and senior Royal Chartered Builder. Wang is well known for guiding large-scale projects, including the Kufa and the New Sindia dams in Iraq. In the domestic market, he has presided over the general contract management of Qingdao Anpu Connector Factory and the Shanghai World Financial Center.

Figure 1. China Zun, Beijing. © Shuhe Photo

At 528 meters, China Zun was the tallest building completed in 2018, and became the new tallest building in Beijing. It is the anchor of a 30-hectare new central business district (CBD) established on the east side of the city, where more than 20 buildings of 150 to 350 meters' height will ultimately rise. CTBUH Editor Daniel Safarik interviewed Wuren Wang of CITIC HEYE Investment Co. Ltd., on the eve of this significant occasion.

Why was it important to reach the 528-meter height of China Zun?

In the past 40 years, the CITIC Group has created landmarks for Beijing in every decade. For example, in the 1970s, we built the city's first international-grade office building – the CITIC International Building on Chang'an Street. In 1989, we constructed the Capital Mansion, which, at 183 meters, was Beijing's tallest building at that time. In the 2000s, we built the National Stadium (Bird's Nest) for the 2008 Olympics. Now, China Zun, as a high-quality high-rise landmark building, reflects the maturation of our development process in our fourth decade, and that of the city as well.

We think China Zun's appearance demonstrates the culmination of the world's most advanced design concepts and equipment manufacturing capabilities, and that it affirms the construction speed of China's high-rise building industry. In the future, it will continue to stand as a comprehensive model of whole-lifecycle management by the owner's development team. It will also show the economic strength and outstanding social responsibility of CITIC Group.

Why was the "zun" form chosen? What are the symbolic, structural, and commercial motivations?

As the elegant shape of the building is derived from the ancient Chinese ritual vessel, the *zun,* people like to call it "China Zun" (see Figure 1). The association is one of affection, just like the National Stadium is called the "Bird's Nest". The zun is a vessel used as a ritual container in ancient Chinese feasts or ceremonies. It is a symbol that represents that China as a "nation of etiquette". China Zun's shape is intended to signify that Chinese culture is striding into a new era, one in which it will move proudly forward and lead the world's cultural and technological progress.

Additionally, the zun in Chinese culture resembles the idea: "Heaven is a circle and the Earth is a square." Learning from that in a literal and practical sense, the structure of China Zun uses circles and squares in order to provide a solid and stable base as well as an elegant shape. At the same time, it reflects both the history and the profound connotations of Chinese culture.

What kind of design choices were made to ensure the safety of the tower in case of an earthquake?

China Zun was fortified to withstand an 8.0-intensity seismic event. To do this, we adopted a combination of anti-lateral-force structural systems, in a configuration we refer to as a "giant outer-frame tube plus core tube." This ensures that it will safely survive the strongest earthquakes, that it will be repairable following moderate earthquakes, and will not register any damage in a minor earthquake.

Beijing is currently planning to move significant government and residential developments further to the south, as well as open a new airport in that direction. How do you think this will affect the business operations and appeal of China Zun and the Chaoyang CBD, whose value is partly based on distance from the center city and the Beijing Capital International Airport?

In September 2017, the Beijing municipal government released its General Urban Plan for the period 2016–2035. In part, it states that the strategic orientation of Beijing should be along several lines: as a national political center, a cultural center, an international

exchange center, and a science and technology innovation center.

The China Zun, as a world-class, supertall headquarters building, conveys and strengthens the four-pronged objective of the Urban Plan. The China Zun decorates the skyline of Beijing, while at the same time, enriches Beijing's reputation for modern architecture and civic landscapes. We believe that, regardless of future developments, the location-specific advantages of the China Zun, close to both the Beijing Capital Airport and the historic city center, as well as in the new CBD, will continue to make a large contribution to Beijing's profile, and will benefit from that as well.

How does the building contend with the high levels of pollution for which Beijing is known?

The glass of the building is comprised of four layers, effectively forming a hollow curtain wall system. This is simple, smooth, and conducive to efficient cleaning. In addition, nine window cleaners are installed at the "waist" on the 73rd floor and at the roof, to ensure that comprehensive cleaning is practical on a frequent basis (see Figure 2). Additionally, the combination of the four-glass double-hollow curtain wall system and the high-performance air purification system of the building plays a role in preventing the ingress of outdoor air pollution and improving the internal circulating air quality of the building.

During the design phase, extensive use of Building Information Modeling (BIM) was made to coordinate more than 30 companies working on the project. To what degree has BIM been translated into the live, operational building, through incorporation into the Building Management System (BMS), for example?

The China Zun project combined BIM, Integrated Business Management System (IBMS), Project Management (PM), and Facilities Management (FM) software together to establish the a "smart operation cloud platform." Beginning with the lightweight BIM construction model, it has been separated into units and can offer a dynamic, three-dimensional virtual environment model of operational management. Based on this, using the Internet of Things (IoT) information integration, the following scenarios will be realized:

Figure 2. The facade of China Zun will be kept clean by two sets of building maintenance units - one at the top, shown here, and one at the "waist" or mid-section of the building. © Shuhe Photo

First, this model connects the dynamic data of the building automation (BA) system with the interface of the BIM model, so that the real-time BA monitoring data can be shared, and in the BIM virtual model, operational status can be observed directly. This turns the two-dimensional IBMS charts into dynamic three-dimensional BIM simulations. It makes the whole practice of operational management more vivid.

Second, the BIM model is associated with the security monitoring, fire alarm, water leak alarm and other systems. When an alarm is triggered, the camera associated with that location will connect to the BIM model, so that the problem can be quickly located and handled.

Third, by scanning QR codes affixed to the physical plant, the building's "big data" network is established. Equipment classification, operational status and contract information are incorporated into the BIM model, giving a real time picture of the actual equipment. Employees can click the equipment model on the smart cloud platform, or scan the QR code on the equipment to read the information stored in BIM database. That way, whether an employee is in the building management office or in the field with a machine, they have the same product information, consumables data, awareness of the availability of spare parts, maintenance procedures, and so on. This makes operations management much more efficient, convenient and accurate.

Finally, the dynamic virtual environment model generated by BIM operating system can be co-operated and combined with digital platforms, such as municipal fire and emergency planning software. Then, we can use it to rehearse any kind of emergency plan and optimize it for our building. ■

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