THE ZENITH TOWER

BUSAN, SOUTH KOREA

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Figure 1. Rendering (Courtesy of Doosan E & C)

The sky looks high but closer to the people who are waiting for the completion of the three residential towers. The Zenith Tower creates a luxurious and modern art residential life environment in a Suyoung bay area, Busan, Korea

The Zenith towers are comprised of three residential towers (total 1,788 units in 70, 75 and 80 story) and a 9 story retail building and five story basement levels, situated on the 42,478 m2 (210m x 200m) reclaimed site in the heart of Suyoung bay area. The total gross area is 572,535m2 (389,200 m2 above grade and 183,335m2 below grade). The tower was designed by a Chicago-based architect firm, De Stefano Partners with the inspiration of the wave of Haeundae beach and surrounding mountains.

The construction started with the groundbreaking in December 2007 and the mat foundations for three towers were completed in summer 2008. The tower foundations were the biggest mat construction with the concrete volumes (12,200 m3, 12,200 m3, 130,000 m3, respectively) in Korea. The massive concrete was significant concrete volume that could not be poured in one day. In the design phase, steel reinforcement conceived by strut and tie method were adapted to reduce mat thickness.

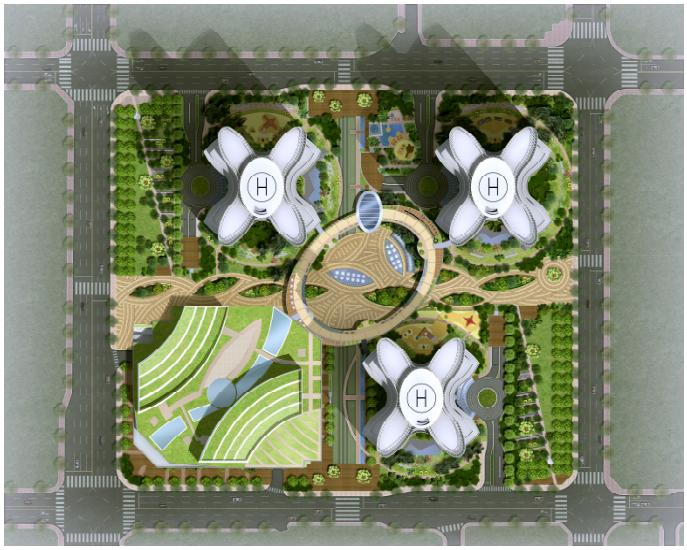

Figure 2. Site Plan (Courtesy of De Stefano Partners)

As a new landmark of city of Busan, the 80 story residential tower engineered by Thornton Tomasetti is rising a unprecedent height of 300m (984 feet), named as a tallest residential concrete building in South Korea when completed in Year 2012.

STRUCTURAL SYSTEM

The flat plate system was selected due to the several advantages including a lower floor height, material cost saving and fast construction cycle due to the simple formwork and repetition of the formwork at every floor.

The one of unique architectural finish is a 5 inch (120mm) radiant heating floor system consisting of an acoustic pad, mortar, autoclaved lightweight concrete and wood or tile finish on the top of flat plate. In the early design stage, this finish with ceiling and interior partition was collaboratively reviewed with architect to determine the optimal floor framing system.

The typical residential floor is a 10 inch flat plate (250 m) spanning approximately 26 feet (8 ~ 9m) between the columns and central core walls without a spandrel beam and interior drop panel. The flat plate is reinforced at top and bottom by D16 to D22 rebar designated as KSD3504 SD40 (fy = 56.8 ksi equivalent to ASTM A615). Shear stud was also used to reinforce the slab-column joint where over-stress in shear occurs due to the unbalanced moment. Typical residential floor to floor height is a 3.2m and 3.6m on the lower and upper floor respectively.

The overall tower stability and resistance is provided primarily by a butterfly shaped core wall and supplemented by equivalent slab moment frame.

Core wall is comprised of 600mm ~ 1000mm thick flange wall and 300mm web wall tied with 750 deep link beam surrounding elevator bank, stairwells and service mechanical area.

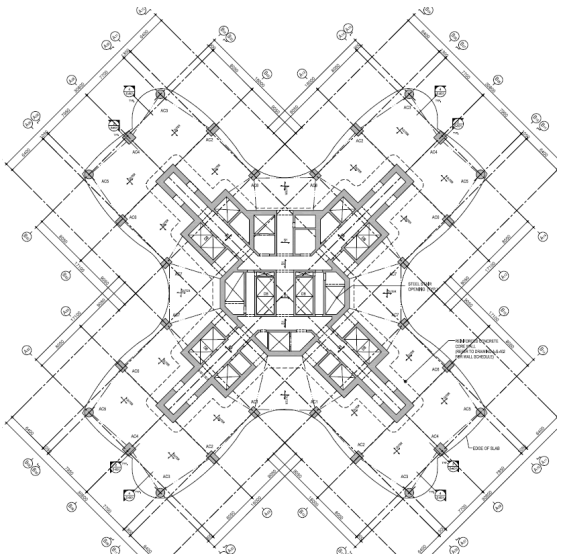

Figure 3. Typical residential floor plan and tower rendering