

PROJECT DETAILS

Official Name: Allianz Tower¹
Other Names: Renaissance Business Center, Renaissance Tower¹
Construction Period: 2012-2014²
Location: Istanbul, Turkey³
Architect: FXFOWLE⁴
Building Function: Office⁵
Owner: Renaissance Development¹
Architectural Height: 185.5m / 609 ft⁶
Floors Above Ground: 40⁷
Floors Below Ground: 4¹
Gross Lettable Area: 43,000 m² office area – 2,000 m² commercial area⁸
Gross Floor Area: 900 – 1,400 m²¹
Regional/National/City Ranking: 56/8/6 (by year 2015)¹
Lettable Office Floor Efficiency Ratio: 80-85 %¹



Figure 1. Rendered view of Renaissance Tower, retrieved from Renaissance Construction

1. Allianz Tower, retrieved from <http://agency.skyscraper.com/istanbul/allianz-tower/12402/>

DESIGN CONCEPT



Figure 6. Rendered view of Renaissance Tower, retrieved from Renaissance Construction

- The designers use detailed analysis of the fertile fundamentals, looked beyond superficial analysis of the fertile domain of this generous heritage to deeper interpretation.¹
- Their design includes not only locally but also within a larger field of worldwide architectural colliers.²
- As the first tall building that visitors to the city encounter from the east route from Sabiha Gökçen Airport to the city center. This condition as a regional marker influenced the tower's "obelisk" form.³
- Renaissance Tower unites opposite in new forms of synthesis. The building is a modern skyscraper, but it is filled with a textural richness and ornamentation appropriate in the East. The exterior skin catches the sun, but it creates transparency. The skin expresses the local culture, but it also refers to a larger aesthetic vocabulary.⁷



Figure 7. Site plan of Renaissance Tower, retrieved from Renaissance Construction

6. Renaissance Tower, retrieved from <http://www.renaissance.com/>

DESIGN CONCEPT

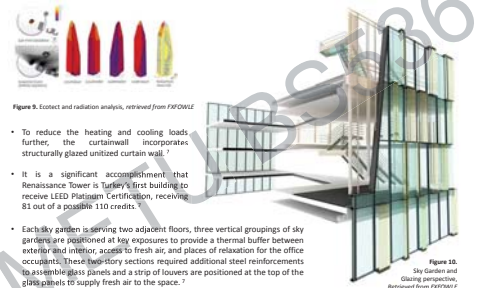


Figure 9. Collect and radiation analysis, retrieved from FXFOWLE

- To reduce the heating and cooling loads, further, the curtainwall incorporates structurally glazed unitized curtain wall.¹
- It is a significant accomplishment that Renaissance Tower is Turkey's first building to receive LEED Platinum Certification, receiving 81 out of a possible 110 credits.²
- Each sky garden is spanning two adjacent floors, three vertical groupings of sky gardens are positioned at key exposures to provide a thermal buffer between exterior and interior, access to fresh air, and places of relaxation for the office occupants. These bay-story sections required additional steel reinforcements (as assembly-bays) panels and a strip of louvers are positioned at the top of the glass boxes to supply fresh air to the space.³



Figure 10. Sky Garden and Glazing perspective, retrieved from FXFOWLE

7. Modern Tower, Ancient City: Renaissance Tower, CT&M Research Paper, 2015

STRUCTURAL DECISIONS



Figure 15. Photograph from wind test¹

- A Wind Tunnel Test has been performed in order to determine the load due to wind loads to analyze the lateral system of the tower. Wind tunnel test upon this better-recognized also include the design structural wind loads at each floor. Analysis and design of the building is done using these wind tunnel test results. Load-determining based on the wind tunnel test has been applied on the structural system and member forces together with the performance limits have been checked.²
- The desired seismic response of the tower structure is assured by special detailing and special devices called Buckling Restrainted Braces (BRB) used as "outriggers" in mid-height of the structural system. This performance is achieved by optimum structural member dimensions and reinforcements.³

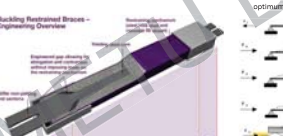


Figure 16. Buckling Restrainted Braces diagram⁴

6. Renaissance Tower, retrieved from <http://www.renaissance.com/>

STRUCTURAL DECISIONS

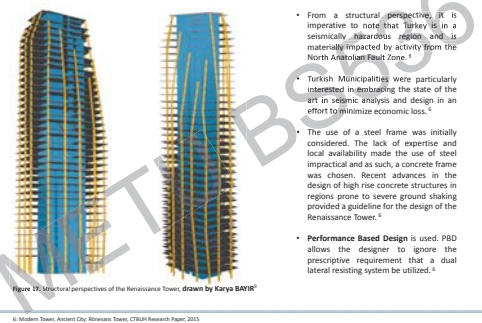


Figure 17. Structural perspectives of the Renaissance Tower, drawn by Karya Bayir⁵

6. Modern Tower, Ancient City: Renaissance Tower, CT&M Research Paper, 2015

STRUCTURAL DECISIONS

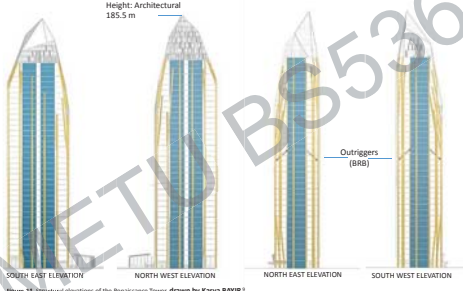


Figure 20. Structural elevations of the Renaissance Tower, drawn by Karya Bayir⁶

8. Structural Drawings, Renaissance Construction

FLOOR PLANS

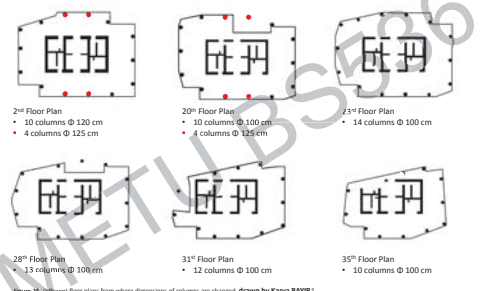


Figure 25. Different floor plans from where dimensions of columns are changed, drawn by Karya Bayir⁷

8. Structural Drawings, Renaissance Construction

PROJECT DETAILS

Structural Engineer: DeSimone Consulting Engineers
Structural Material: Concrete⁸

Structural System:

According to Günel & Ay
Outriggered Frame System²

According to Smith & Coull
Outrigger Braced Systems³

According to Tarantini
Outrigger and Belt Truss Systems⁴



Figure 2. Rendered view of Renaissance Tower¹

1. Allianz Tower, retrieved from <http://agency.skyscraper.com/istanbul/allianz-tower/12402/>

BUILDING FORM

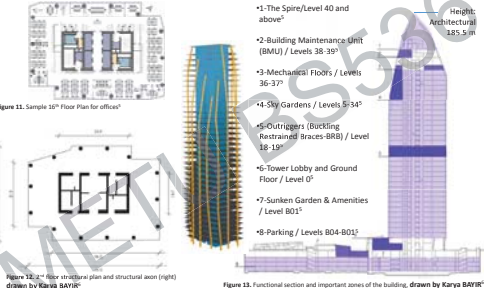


Figure 11. Sample 10th Floor Plan for office¹

Figure 12. 10th Floor structural plan and structural section (right) drawn by Karya Bayir²

5. Renaissance Tower, retrieved from <http://www.renaissance.com/>

STRUCTURAL DECISIONS

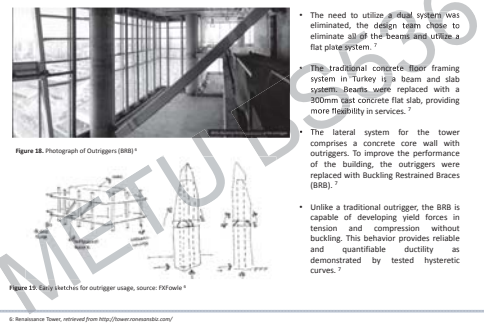


Figure 18. Photograph of Outriggers (BRB)³

Figure 19. Key sketches for outrigger usage, source: FXFOWLE⁴

6. Renaissance Tower, retrieved from <http://www.renaissance.com/>

AROUND THE TOWER

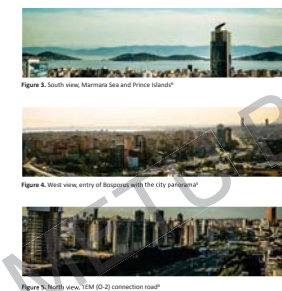


Figure 3. South view, Marmara Sea and Prince Islands¹

Figure 4. West view, entry of Bosphorus with the city panorama²

Figure 5. North view, TEM (D-2) connection road³

Figure 6. Renaissance Tower, retrieved from <http://www.renaissance.com/>

- Istanbul is an ancient city which is selected as the capital city of the Roman, Byzantine, and Ottoman Empires. Reflection of these periods could clearly examined by the city's religious, cultural, and architecture.⁴
- The building location is selected strategically. It is settled at the junction of E-5 and TEM Highway connection road in Alaztepe⁵
- The building welcomes the travelers, with its very good visibility, from both highways while appearing in the city silhouette respectfully.⁶
- With its state-of-art design and unique architectural form, the building is the most significant landmark of the Asian side of the city.⁷
- The Renaissance Tower is surrounded by many office buildings, shopping centres and luxury residential buildings.⁸

The Spire/Level 40 and above



The spire is the peak point of the building. It has a steel structure, which is placed over and mounted on the top of the concrete structure of the building.¹

Building Maintenance Unit (BMU)



BMU is placed on a rail system and consists of a huge engine (robot system) and it is programmed to reach every single panel on a determined path.²

Mechanical floors / Levels 36-37



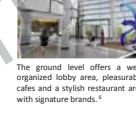
Mechanical levels have been located on the top of the building because unlike other high-rise buildings a continuous function throughout the levels is ensured.³

Sky Gardens / Levels 5-34



Two story gardens provide a thermal buffer between exterior and interior access to fresh air and places of relaxation for office workers.⁴

Tower Lobby and Ground Floor / Level 0



The ground level offers a well-organized lobby area, pleasurable cafes and a stylish restaurant area with signature brands.⁵

Sunken Garden & Amenities



With its visibility from the ground level and centralized location on the floor, Sunken Garden is an attraction point for the visitors and leases.⁶

Figure 14. Images and explanations about important zones of the building⁷

6. Renaissance Tower, retrieved from <http://www.renaissance.com/>

STRUCTURAL DECISIONS

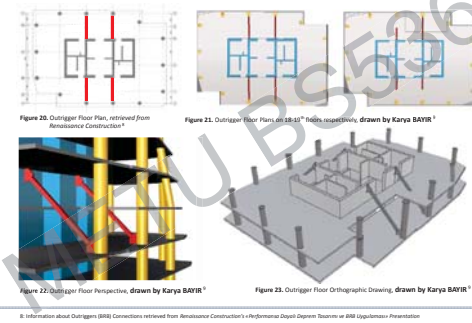


Figure 20. Outrigger Floor Plan, retrieved from Renaissance Construction¹

Figure 21. Outrigger Floor Plan, on 18-19th floors respectively, drawn by Karya Bayir²

Figure 22. Outrigger Floor Perspective, drawn by Karya Bayir³

Figure 23. Outrigger Floor Orthographic Drawing, drawn by Karya Bayir⁴

8. Information about Outrigger (BRB) Connections retrieved from Renaissance Construction's Performance Based Design Team as BRB Uygulama Raporu

CONSTRUCTION PERIOD

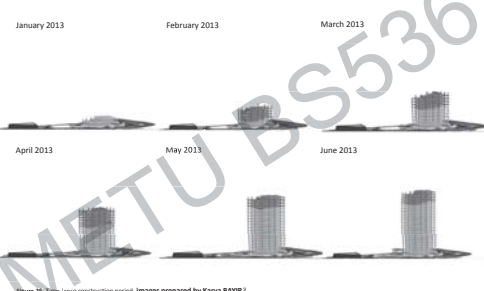


Figure 26. Time lapse construction period, images prepared by Karya Bayir⁵

8. Structural Drawings, Renaissance Construction

CONSTRUCTION PERIOD

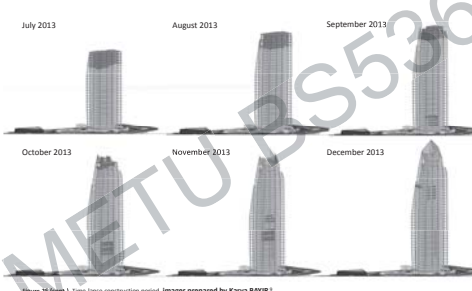


Figure 27. Time lapse construction period, images prepared by Karya Bayir⁶

8. Structural Drawings, Renaissance Construction



Figure 27. Construction Photographs 28/05/2013 *



Figure 28. Out-rigger Hinge Connection 28/05/2013 *

* Information about Outriggers (BR) Connections retrieved from Renaissance Construction's «Performansi Dayali Deprem Tahanan» dan «Uji Kelayakan» Presentation

1. Allianz Tower, retrieved from, <http://legacy.skyscrapercenter.com/istanbul/allianz-tower/11601/>
2. Günel, H. & Ilgin, E. (2014). *Tall Buildings: Structural Systems and Aerodynamic Form*. Routledge – Taylor and Francis Book Company
3. Taranath, B. (1998). *Steel, Concrete & Composite Design of Tall Buildings*. New York: McGraw-Hill Book Company
4. Smith, B.S. & Coull, A. (1991). *Tall Building Structures: Analysis and Design*. New York: Wiley.
5. Project Documents, Renaissance Construction
6. Information about Renaissance Tower, retrieved from <http://tower.romesansibiz.com/>
7. Modern Tower, Wilent City, Rhesans Tower, CTBUH Research Paper, 2015
8. Information about Outriggers (BR) Connections retrieved from Renaissance Construction's «Performansi Dayali Deprem Tahanan» dan «Uji Kelayakan» Presentation
9. Structural Drawings, Renaissance Construction