



## The Structural Design of The World's Tallest Structure: The Burj Dubai Tower

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## Summary

The design of supertall buildings is typically governed by their interaction with lateral winds and gravity loads. Selection of the building shaping and structural system can greatly affect the wind and gravity behavior of the structure. This paper will consider the case study of the Burj Dubai Tower to demonstrate the design process and philosophy utilized in the design of supertall buildings.

**Keywords:** Wind engineering, buttressed core, high performance concrete

## 1. Introduction

The Burj Dubai Tower, when completed, will be the world's tallest structure. The superstructure is currently under construction. The final height of the building is a "well-guarded secret". The height of the classic-style multi-use skyscraper will "comfortably" exceed the current record holder, the 509 meter (1671 ft) tall Taipei 101. The 280,000 m<sup>2</sup> reinforced concrete multi-use Tower is predominately a residential and office usage, but also houses retail and an Armani Hotel. The goal of the Burj Dubai Tower is not simply to be the world's highest building; it's to embody the world's highest aspirations (Figure 1).

Designers purposely shaped the structural concrete Burj Dubai – "Y" shape in plan – to reduce the wind forces on the tower, as well as to keep the structure simple and foster constructability. The structural system can be described a "buttressed" core (Figure 2). Each wing, with its own high performance concrete core and perimeter columns, buttresses the other via a six-sided central core, or hexagonal hub. The result is a tower that is extremely stiff torsionally. SOM purposely aligned all the common central core and column elements to form a building with no structural transfers.

Each tier of the building steps back in a spiral stepping pattern up

