

Burj Khalifa: The Supertall Megaproject That Finished on Time in a Financial Storm

How Emaar, SOM and Samsung C&T Delivered the World's Tallest Building While Dubai Faced the Global Financial Crisis and a Severe Property and Debt Downturn

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Key Facts

Cost: Widely reported at approx. US\$1.5 billion (tower only); never officially disclosed

Date: Construction January 2004; exterior complete October 2009; opened 4 January 2010

Category: Buildings

Executive Summary

The Burj Khalifa - 828 metres, 163 floors - was designed, engineered and built between 2003 and 2010, and it opened almost exactly on its original schedule even as Dubai's property market collapsed and its state conglomerates slid into a debt standstill weeks before the inauguration. This investigation examines what went right: a fast-track design-build structure that overlapped design and construction, a structural system (the buttressed core) chosen for buildability as much as elegance, obsessive wind engineering, and a construction joint venture with proven supertall form. It also records honestly what the glossy record omits: a budget never officially disclosed, and a workforce drawn overwhelmingly from low-paid migrant labour.

Executive Lessons

- Choose Structure for Buildability, Not Just Beauty

SOM's buttressed core was selected because it could be built in repetitive, climbable concrete formwork at extreme height. The Burj's form is a structural system first and an image second - the reverse ordering is where supertall projects usually die.

- Treat Wind as a Design Input, Not a Compliance Check

RWDI's wind-tunnel programme ran in iterative loops with SOM's designers; setbacks, orientation and the spiralling cross-section were tuned to disrupt vortex shedding. On record-height buildings, wind governs - and it must shape the concept, not merely verify it.

- Fast-Track Only Works in Frozen Zones

Design and construction overlapped, but discipline was maintained by freezing design zone by zone - piles, then core, then repetitive floors - while the repetitive three-day-per-floor cycle did the schedule work. Fast-track without zonal discipline is how Berlin Brandenburg happened; with it, it is how the Burj happened.

- Buy Proven Teams for Record Attempts

Samsung C&T arrived with Petronas and Taipei 101 experience; SOM with decades of supertall design; Turner as project manager. Record-breaking projects are the wrong place for first-time teams - the learning curve must be purchased, not climbed, on site.

- Secure the Balance Sheet Behind the Ambition

The tower survived the 2008-09 Dubai debt crisis because its financing was substantially committed and, ultimately, because the UAE federation stood behind Dubai. Projects of this scale carry sovereign-grade financial risk whether or not it is written into the contract.

- Price the Social Ledger Into the Success Story

A workforce of ten thousand-plus low-paid migrants delivered the tower. Any honest assessment of 'what went right' must include labour conditions, or the lesson exported elsewhere will be incomplete.

Timeline

- 2003: Emaar Properties runs an international design competition for the Downtown Dubai centrepiece tower; SOM's Y-shaped concept by Adrian Smith and Bill Baker is selected.

- 2004-01: Construction begins on Burj Dubai; excavation starts while design development continues under a fast-track programme.
- 2004: Main construction contract awarded to the Samsung C&T / BESIX / Arabtec joint venture; Turner Construction serves as project manager.
- 2005: 192 bored foundation piles (1.5 m diameter, roughly 50 m deep) completed; the tower's repetitive floor cycle accelerates toward a three-day-per-floor rhythm.
- 2007: The rising tower passes the heights of the Sears (Willis) Tower and then Taipei 101; high-pressure concrete pumping sets successive world records.
- 2007-07: Burj Dubai exceeds Taipei 101's 509 m to become, in progress, the world's tallest building; the final height remains undisclosed.
- 2008-09: The global financial crisis reaches Dubai; property prices begin a collapse that will halve values and freeze emirate-wide construction.
- 2009-01: Tower tops out at 828 m; the spire is completed within the structure's final works.
- 2009-10-01: Exterior cladding and structure declared complete, as Dubai's economy deteriorates around the finished tower.
- 2009-11-25: Dubai World requests a standstill on roughly US\$26 billion of debt, including obligations of Nakheel, triggering a global market shock.
- 2009-12-14: Abu Dhabi provides a US\$10 billion support package to Dubai, allowing Nakheel's maturing sukuk to be paid.
- 2010-01-04: The tower opens as Burj Khalifa, renamed for the UAE president and ruler of Abu Dhabi, Sheikh Khalifa bin Zayed Al Nahyan - broadly on its original schedule.
- 2010-10: CTBUH confirms the official height at 828.00 m and awards the Burj Khalifa its Global Icon recognition at the 2010 awards ceremony.

Sources

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