

Project:
Burj Khalifa

Location:
Dubai, UAE

Project completed:
2010

Owner/s:
Emaar Properties

Contractor:
Arabtec/Samsung/Besix JV.

Designer/Engineer:
Skidmore, Owings & Merrill

Concrete producer:
Unimix

Market sector:
Commercial/Residential

Products used:
MasterGlenium® SKY 504
650,000 liters
MasterGlenium® 110UN
75,000 liters
MasterGlenium® Stream2
19,000 liters

Burj Khalifa, Dubai, UAE

Master Builders Solutions pushes the boundaries of concrete engineering



The background

Burj Khalifa was designed to be the centre-piece of a new development in an area previously derelict for many years. The World's tallest free-standing structure is now at the centre of a mixed-use development called Downtown Dubai combining 30,000 homes, 9 hotels, 19 residential towers, lakes and parkland in a total area of 2 km².

The challenge

The Burj Khalifa now stands at over 800 m tall. To reach this world record the structure of the building had to comply with strict design and durability criteria. One unique challenge was ensuring the concrete mix design for the structural core of the tower was capable of being pumped to formidable heights. The structural core of the tower required nearly 170000m³ of concrete designed for 80 N/mm² compressive strength.

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Burj Khalifa, Dubai, UAE

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Our solution

A series of concrete trials preceded initiation of the project and Master Builders Solutions' MasterGlenium® SKY 504 met the contractor's exacting requirements. It was the only concrete admixture that could offer the combination of early strength and workability retention at ambient temperatures of above 45°C in a mix to be pumped to a height of at least 600 m - using a single pump at ground level.

Other Master Builders Solutions structure references

- Al Attar Tower - Dubai
- Dubai Arch Tower - Dubai
- Infinity Tower - Dubai
- Jebel Ali Power Station - Dubai
- Dubai Airport Expansion - Dubai
- Grosvenor House Hotel - Dubai
- Palm Jumeirah Sewage Works - Dubai
- Adwea Headquarters - Abu Dhabi
- Al Jaber Tower - Fujairah

Projects facts at a glance

Getting the mix right – consistently – was critical. Concrete pumps employed a pair of pistons to push the mix through a pipeline to the point of delivery. There is enormous pressure on the concrete in the pipeline from the pistons at these record-breaking heights. In addition, there is the weight of the concrete itself to factor in. Any deficiency in the mix design would create a blockage in the pipeline. MasterGlenium® SKY enabled exacting mixes to be supplied consistently, on an industrial scale, and pumped to the required heights. The hyperplasticiser achieved 100Mpa working on a water cement ratio of just 0.27

Master Builders Solutions

The Master Builders Solutions brand brings all of expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.

The know-how and experience of a global community of construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We at Master Builders Solutions leverage global technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make more successful and drive sustainable construction.

Further information is available at:
www.master-builders-solutions.com/en-ae