

# Makkah Clock Tower Project in Makkah

Project in 2010/13 - in the Kingdom of Saudi Arabia



## ACO. The future of drainage.

ACO Multiline V100 Polymer channels with brickslot elements,  
ACO ShowerDrain and a rain gutter in stainless steel

Jabal Al Qala'a is an iconic residential and hotel superstructure offering world-class accommodations for visitors and residents of the Holy City of Makkah Al-Mukarramah. Often referred to as Makkah's Royal Clock Tower, Jabal Al Qala'a majestically stands on a 23 ha prime site south of the Holy Haram within walking distance from the Haram's extending outdoor plazas. With the world's largest built-up area of 2.8 million m<sup>2</sup>, the unique complex spreads over seven towers above podiums totaling up to almost a third of the total space program designed for a total occupant load of 136,000. The Makkah Clock adorns the structure's highest tower some 600-m above ground level. As part of the King AbdulAllah Al Saud Endowment for the expansion and works of the Two Holy Mosques, we embarked on the architectural design in 2001 and further supervised the construction of the complex until the project's completion in 2010. The size and stature of Jabal Al Qala'a makes it prone to the sandstorms that usually hit the Holy City for days.

The effect of the engulfing massive cloud of dust and strong wind gusts were tested with a CFD numerical model. The model studied the effect of wind by testing the wind induced forces for all possible scenarios and verifying against external numerical and experimental models that were simultaneously conducted at the time. All surrounding structures, including the existing and future developments, which could possibly be impacted by the wind effects, were included in the model to create the closest site duplication possible.

### Reference at a glance

**Project:** Makkah Clock Tower  
**Year of construction:** 2010/2011

#### External drainage products:

- ACO Multiline Flat channels with stainless steel brickslot elements
- ACO Multiline V100S with perforated grating in stainless steel

#### Building drainage products:

- ACO Modular channels with perforated gratings
- ACO Roof Drains and rain water gutter
- ACO ShowerDrain

#### ACO Systems FZE

Office, Factory & Warehouse  
Jebel Ali Free Zone South 1, Plot 0511  
PO Box 18672, Dubai, United Arab Emirates  
Tel. 00971 4 880 69 98 E-mail: info@aco.ae

Octagon Rain gutter in stainless steel



ACO Multiline V100S polymer channel with brickslot element

