



MAKKAH CLOCK ROYAL TOWER HOTEL – MAKKAH, SAUDI ARABIA

# Royal landmark

When compared to everything else in the world, the Makkah Clock Royal Tower Hotel can only be described in superlatives: the tallest hotel, the tallest clock tower, the largest clock face, the largest indoor space (1.6 million square meters for the total project), and on the list of tallest buildings, it currently holds second place.



Soaring above the clock is a beautiful glass dome that houses the lunar research center and cosmology center with some of the biggest telescopes in the world.

### Building for the masses

The holy city of Makkah is home to the world's largest mosque, the Masjid Al Haram. The mosque can hold up to 600 000 people and is currently undergoing expansion to increase the total size to accommodate an additional one million people.

The Makkah Clock Royal Tower Hotel project provides high quality accommodation and recreation for visitors to the Masjid Al Haram, situated directly adjacent to the hotel. The structure is made up of seven towers, which all rest upon a 15-story podium that includes a retail area. The three towers on either side of the clock tower are between 200 and 300 meters tall. The clock tower stands at 601 meters. In one of its grandest undertakings, KONE delivered a People Flow® solution like no other.

### Moving the masses

"Visitors to Makkah normally practice formal prayers five times per day," says **Tarek Elnaggar**, Senior Vice President at KONE who was regional director for KONE Middle East during the project. "The goal of the customer is to ensure that up to 75,000 people can exit all 7 buildings through the podium in an organized and timely manner every prayer time."

This required a thorough study for optimum people flow solutions, resulting in an extraordinary amount of equipment: over 100 escalators and more than 180 elevators in the podium and clock tower alone. In addition, KONE implemented special group control software with artificial intelligence capabilities to learn and track passenger traffic patterns in order to optimize people flow. The elevators include large shuttles that can hold 54 passengers each and take visitors up to the 15<sup>th</sup> level, one of the sky lobbies of the tower.

Particularly stunning are the elevators that take visitors up to the astronomy floors. The cars incorporate computer screens behind glass walls. Travelers see a realistic simulation, including the sky above, of what the view would be if they were in scenic elevators traveling on the outside of the building.

### Success factors

With a building of this size, the environmental footprint is significant. Eco-efficiency was naturally important to the customer. "We were able to demonstrate that we could save 30 percent on their energy bill with our equipment, compared to the traditional equipment of our competitors," says Elnaggar.

"Another key factor in winning the project was the KONE team. We built up a strong team, pulling top-notch experts from all over KONE. I don't think KONE has ever gone through such a rigorous design process, which lasted about 15 months."

Since the early '80s, KONE has had equipment in the Masjid Al Haram mosque. KONE installed hundreds of extra heavy-duty escalators to withstand outdoor weather elements. These escalators have proven to be extremely reliable, and of the highest quality, contributing to KONE's selection for the clock tower project.

"There is nothing that comes even close to the people flow challenge in Makkah," explains Elnaggar. "When you are in the mosque during peak times, all you see are rivers of people going up or down the escalators, before and after prayers."

With the clock tower project now completed, KONE turns its attention to the massive expansion project for the Masjid Al Haram mosque. KONE aims to deliver a People Flow solution for the mosque that will soon be so large that its capacity alone, over 1,6 million people, will rival that of many cities around the world.

## SUMMARY

### Challenge

- To provide a People Flow® solution for one of the largest structures that allows up to 75,000 people to leave the buildings in 30 minutes or less for prayers five times a day

### Solution

- Special design team that met regularly with key stakeholders worldwide
- Specially recruited project team who were trained specifically for this undertaking
- Massive amounts of equipment to handle People Flow as seen nowhere else in the world

## FAST FACTS

### Makkah Clock Royal Tower Hotel

- Year of completion: 2012
- Clock tower:
  - Height: 601 m
  - Floors: 120
- Podium:
  - Height: 115 m
  - Floors: 15
- Architect: Dar al-Handasah Shair & Partners
- Developer: Saudi Binladen Group

### KONE Solutions

- Clock tower:
  - 89 KONE MiniSpace™ elevators
  - 5 KONE MonoSpace® Special elevators
  - 16 KONE extra heavy-duty, high-efficiency Transvario escalators
- Podium:
  - 75 KONE MiniSpace™ elevators
  - 4 KONE MonoSpace® Special elevators
  - 111 KONE extra heavy-duty, high-efficiency Transvario escalators
- Adjacent towers:
  - 10 KONE MiniSpace™ elevators
  - 2 Helipad elevators
  - 6 KONE extra heavy-duty, high-efficiency Transvario escalators

