

Designs for the World's Tallest Building Rest on RJA's High-Rise Expertise and Safety Ingenuity

Challenge. Rolf Jensen & Associates (RJA) has the honor of being the fire and life safety consultants for Burj Khalifa, which will be the world's tallest building upon its completion in 2008. As impressive as it sounds, that description only hints at the difficulty – as well as the distinction – of working on this project.

RJA is a forerunner of tall building consulting, particularly in the fast growing city of Dubai in the United Arab Emirates. RJA consultants have been called on to share their expertise for numerous, high-profile high-rise projects around the world where the design team is looking for ways to make a building safe, yet allow for flexibility in design.

In Dubai, the sky truly is the limit. As developers strive for bigger and better buildings, safety consultants find that they're pushing the envelope on what could – and should – be done. If consultants don't make the project safer than the last high-rise building, they'll be criticized for not being safe enough. If they go too far the other way, safety factors will hinder design and building functionality.

Solution. Burj Khalifa's developer, Emaar Properties, helped RJA find the happy medium in this debate by taking a proactive approach to safety and fire protection. When RJA proposed non-required safety enhancements, Emaar willingly agreed. One enhancement that RJA had suggested, for example, was enabling the building's elevators to operate in emergency mode to evacuate occupants. That way, the fire department could use manual controls to continue elevator operation to safe floors. Adding this function alone has cut RJA's projected full building evacuation time in half.

Another enhancement is the integration of areas of refuge. Certain floors have been designed as safe areas, and RJA has consulted on providing special life safety features to protect these areas, such as a direct connection to stairs and pressurization to limit the spread of smoke. This plan makes it easier and quicker to relocate people away from a contained zone of incident without forcing a more complete evacuation.

As with many multi-use high-rise developments, Burj Khalifa will be occupied by a diverse population of residents and visitors, although its probable attraction as a tourist destination will present a stronger multinational component to the equation than usual. Characteristics of the occupants will vary widely in building familiarity and nationality. A lot of tourists, for example, will frequent the observation level, which means that signage and emergency response planning need to account for multiple languages.

Burj Khalifa will also be a destination for all forms of dignitaries who will have their own security details. Due to this, RJA spent extensive time developing response procedures that could incorporate dignitary security requirements prior to their arrival.

Result. Burj Khalifa is located in the Downtown Burj Khalifa development that includes more than 60 high-rise buildings, mosques and the Dubai Mall, which will be the world's largest mall. Due to the Burj Khalifa's location in the Middle East and its iconic nature, RJA and Emaar are not only developing a Burj Khalifa Crisis Response Plan, but also a Site-Wide Crisis Management Plan that will be designed to manage crises at Downtown Burj Khalifa. Dubai Civil Defense and the Dubai Police Department are involved in the development process to help facilitate a crisis management approach.

The Burj Khalifa Crisis Response Plan has about 50 response procedures related to four types of crises: building system, human, terrorism and weather. Each of these responses has five response levels that allow Burj Khalifa management to escalate/de-escalate the response efforts as dictated by the crisis. The Site-Wide Crisis Management Plan will incorporate the same elements and will allow for a coordinated response to a crisis that may occur at Downtown Burj Khalifa.

As the Burj Khalifa Crisis Response Plan nears completion, RJA's other international clients are starting to see the need for comprehensive crisis response plans for their buildings and developments. RJA is able to work with its client from the beginning of design throughout the construction process and into operations, providing Emaar and other clients with a turnkey solution to fire, life safety and emergency response planning.



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