

## CIS case studies

**Project:** World Trade Centre

**Location:** Bahrain

**MEP consultant:** WS Atkins

**MEP contractor:** Emco



## **About the World Trade Center:**

With unique vision and a thriving business and social culture, The Kingdom of Bahrain offers a world class destination and an array of opportunities for companies, visitors and residents around the globe.

The Bahrain World Trade Center is a symbol of achievement and a reflection of momentum behind the regions fast growing economy.

Its innovative design combines the essential elements of lifestyle and business to create a powerful emblem of aspiration and accomplishment. The Bahrain World Trade Center is more than its landmark commercial towers, offering amenities such as an exceptional shopping and dining environment, a five star hotel and sophisticated office accommodation.

The Bahrain World Trade Center is an extension to the existing Sheraton Hotel complex and comprises two 50-storey sail-shaped commercial office towers, which taper to a height of 240m and support three 29m diameter horizontal-axis wind turbines. The towers are integrated on top of a three-storey podium which accommodates a new boutique shopping centre, fine dining, business centre and car parking.

## **The World Trade Center is the Kingdom's first truly intelligent building and features an array of sophisticated SMART features:**

- High speed broadband internet access with IP telephony and wireless, unified messaging on a single converged voice-data-video network.
- Advanced security systems with intelligent secured access, protection, surveillance, warning and responses.
- Intelligent lighting control enabling architectural lighting and energy management.
- District cooling system provides a cost effective environmentally friendly alternative to traditional air conditioning systems
- Exceptional management systems to reduce costs, and deliver one bill to occupants that include rent, energy and infocomm technology (ICT) services

## Harnessing the power of wind energy (World's first):



Inspired by Arabian wind towers, the sail-shaped towers funnel the sea breeze into the three wind turbines. They act as aero-foils, funnelling and accelerating the wind velocity between them. The vertical sculpting of the towers also progressively reduces the pressure so that when combined with the rising velocity of the onshore breeze at increasing heights, a near equal regime of wind velocity on each turbine is achieved.

Understanding this phenomenon has been a key factor behind the success of this design. Extensive wind tunnel testing also confirmed how the shapes and spatial relationship of the towers sculpt the airflow, creating an 'S' flow. This ensures that within a 45° wind angle either side of the central axis, the centre of the wind stream remains perpendicular to the turbines. In this way, the turbines' potential to generate power is dramatically increased.

- The shape of the towers channels the airflow through the turbines, improving their function and energy generation output.
- 3 turbines are each supported by an individual 30m bridge spanning between the two towers
- Connected to generators, the wind turbines feed power to the building's grid, reducing the load on external power sources and providing financial benefits to the occupants.



**Clipsal C-Bus was selected amongst several other brands to control lighting within the 2 towers.**

**Scope of Clipsal C-Bus:**

The lighting management requirement at the project called for the following control strategies to be implemented:

1. Lighting control system (switching) for communal areas and external lighting (energy management).
2. Dimming and scene control of lighting at the entrance lobbies
3. Integration to the Building Management System, enabling facilities management (control and monitor)
4. Control of car park lighting based on time schedules (energy management)
5. Control of lighting in the Sheraton hotel lobby
6. Mood lighting control in the restaurants at Sheraton

## C-Bus control strategy deployed:

- **No. of C-Bus networks deployed:** 6 networks (3 in each building)
- **Key inputs used:** E-series C-Bus key inputs (E5034NL) were used as wall stations, and meant to override the controlled lighting circuits. Combination of C-Bus 360 degree ceiling mount sensors (5753L and 5753PEIRL) were used to control lighting based on movement detection in the corridors and lift lobbies. C-Touch was used for the architectural lighting control (dimming & scene control).
- **Output modules used:** A combination of 12 channel and 4 channel C-Bus relays (active & passive) were used to switch lighting circuits. A combination of 4channel x 2A, and 4channel x 5A dimmers were used for architectural dimming.
- **Networking:** Combination of C-Bus network bridges, and Ethernet Network interfaces were used, where by internal networks within each building were done serially over network bridges, and each of the two serial networks were interfaced to a dedicated PC over the Ethernet Network Interface (CNI).
- **Facilities management:** A C-Bus schedule Plus software loaded on a C-Bus PC (server), does the control, monitor and management of all C-Bus devices from the head-end. The server will run a C-Bus to BACnet gateway, which will integrate to the BMS PC (Client), over Ethernet.
- **Integration to the Building Management System:** C-Bus integrates to Honeywell BMS over BACnet.