



2016 On Site Review Report

by Gökhan Karakuş

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Doha Tower

Doha, Qatar



Architect

Ateliers Jean Nouvel

Client

Sheikh Saud bin Muhammed Al Thani

Design

2002-2003

Completed

2012

Doha Tower

Doha, Qatar

I. Introduction

The Doha Tower is one of the most visible architectural landmarks of Doha, giving a modern identity to the skyline of the city from its location in the West Bay business district. Designed by French architect Jean Nouvel, the 46 story Doha Tower was commissioned by Sheikh Saud bin Mohammed Al Thani specifically to address the need for an outstanding example of contemporary architecture for Doha and its skyline that also reflected Qatar's Islamic heritage. Nouvel's design for the Doha Tower is based on a round-tower typology covered with a facade in aluminium as an adaptation of the Islamic mashrabiyya screen with an abstract, geometric pattern at different scales producing a sculptural aesthetic. This aluminium screen is part of a double facade combined with a glass curtain wall that creates a play of light and shade in the interior office spaces. Large open-plan floors are generated through the application of an innovative diagrid (diagonal grid) structure of round, reinforced concrete columns located in the perimeter of each office floor.

A. *Brief historical background*

The commission for the Doha Tower was conceived in the late 1990s as a part of a strategy by the government of Qatar to increase the awareness of the country on the global stage using the visibility and identity provided by cultural activities in art and architecture. A key figure in this strategy was Sheikh Saud bin Mohammad al-Thani, who was the Minister of Culture, Arts and Heritage from 1997 to 2005. Sheikh Saud conceived and started a strategy which goal was to construct iconic buildings in Doha to achieve an international presence for a country that otherwise lacked examples of contemporary culture. To this end, Sheikh Saud was given a mandate by the Emir of Qatar at the time, Sheikh Hamad bin Khalifa Al Thani, to develop these architectural and cultural assets including collections and institutions of art housed in buildings of architectural distinction.

Sheikh Saud was at the centre of this national strategy and he took the initiative on many fronts, becoming the face of contemporary Qatari culture for many years, starting in this period in the early 2000s. His investments into Islamic art were the most visible of his efforts that also included the creation of the National Museum of Qatar and the Museum of Islamic Art. All this was done at a period in Qatar's history in the 2000s during which investments into "knowledge sectors" outside of Qatar's energy industry, such as the Al Jazeera news channel and the Doha Film Institute, were being initiated. Sheikh Saud's mandate would see him as a highly visible figure in cultural circles throughout the world in this period, known for his taste and acumen in collecting. His vision for Qatar and Doha, and the significant decisions regarding these national Qatari investments he personally made, made him a pioneer in the long-term political and economical strategy for the Emirate of Qatar.

The urban setting in Doha would also be an important part of this agenda, as the skyline of Doha was, for Sheikh Saud, an "asset" that needed improvement and investment. Using the benchmark of other global capital cities identified with distinctive skylines of tall buildings, he set out to create a key central point for Doha's skyline on the West Bay. It was in this context of seeking to bring an iconic tower to the centre of the rapidly expanding business centre of the West Bay, in a bid to give the city a distinct identity that the planning for the Doha Tower started. Sheikh Saud was the main driving force behind the policies that resulted in the creation of this tall building as a landmark for the Qatar skyline.

B. Local architectural character, including prevalent forms and materials

The Doha Tower is located in the West Bay of Doha, in what is now the business centre of the city. The West Bay, as an urban agglomeration, dates to the late 1990s and is characterised primarily by office and some residential and hotel towers built behind the large Corniche Road. The district's first important building was the Doha Sheraton Hotel, by the American architect William L. Pereira, completed in 1982 which set the tone for this area as a zone for modernist architecture. The pyramidal volume of the Sheraton was for many years the architectural icon symbolising the city, its location at the northern tip of Doha Bay establishing the concept of the skyline for Doha.

The area, completely built up as a business district on low-lying desert land and landfill, established its architectural character in the 2000s with the construction of towers behind and to the south of the Sheraton. An initial group of office buildings, some housing governmental offices, and hotels dating from the late 1990s, with primarily concrete and stone cladding, gave way in the 2000s to very tall buildings with glass facades. These commercial towers, including the Tornado Tower, Qatar World Trade Center and the Salam Tower built in a number of styles by international architectural firms in this period, do not make any meaningful contribution to either the West Bay as an urban zone, Doha as a city or to Qatari culture. The architectural character and value to the city of many of these towers is minimal, serving only to establish a skyline for Doha where none existed before. It is in this context that the Doha Tower stands out as the only building of architectural distinction in this fairly banal collection of tall towers

C. Climatic conditions

Qatar has a dry, sub-tropical desert climate, with low annual rainfall and hot and humid summers. In spring, temperatures are warm but not hot and the evenings are cool. June to September is very hot with the average high temperature for June, July and August being around 42°C, and very high temperatures up to 50°C can be reached. In the winter months, temperatures are cooler but still warm, with the average highs of around 23°C from December to February. Almost all rainfall occurs during the winter months, mostly in heavy cloudbursts and thunderstorms.

D. Site and surroundings

The Doha Tower is located in the West Bay business district on Corniche Road. The urban fabric of the district is dominated by wide avenues interconnected by narrower streets and interspersed with the private parking lots of many of the towers. The Doha Tower is one of many tall towers in this area of avenues and streets crisscrossed by these vehicular byways with no significant pedestrian circulation. Each of these towers is an island unto itself, surrounded by outdoor parking areas and small plazas.

The Doha Tower sits on Corniche Road which is the main traffic artery linking the West Bay to the older sections of Doha to the south. Access to the Tower is via this road through a side street. The landfill areas of the Corniche Promenade and Sheraton Park across the avenue are only accessible to pedestrians. But, largely, the park area and its high level of pedestrian activity is a separate zone, distinct from the agglomeration of the West Bay commercial buildings it fronts.

The Doha Tower, surrounded by this urban landscape, has a discreet, almost hidden entrance marked by a driveway for vehicles and a double staircase for pedestrians that descends into the circular road that surrounds the building. Pedestrian and drop-off access to those arriving by vehicle are realised through multiple entrances to the lobby from this sunken circular drive surrounded by landscaping and topped by a steel and glass pergola. The combination of this drive covered by the pergola and the landscaping of small bushes and

trees represents the only publicly accessible area of the building. In contrast to the many other commercial towers of the area it is fairly large public space acting as a urban pocket park, but because of its position below grade, hidden from view from the surrounding streetscape, it does not generate many visitors.

E. Topography

The West Bay area is built on existing desert fronting the Bay of Doha and the Persian Gulf. The shoreline park and avenue of the Corniche were built on top of a landfill as part of planning efforts to regularise this raw desert landscape and uneven shoreline. The topography of the West Bay is typical of Doha and Qatar in its flat nature, with man-made interventions in parks and landfills? The Doha Tower is one of the many buildings built in this man-made urban environment.

III. Programme

A. History of the inception of the project

The project was initiated by Sheikh Saud in the early 2000s as part of his larger strategy to generate an urban identity for Doha through buildings with distinctive architecture designed by well-known international architects. As the head of cultural administration in Qatar at the time, the Sheikh was responsible for the initiation of a number of these buildings, including the Museum of Islamic Art by I.M. Pei and the National Museum of Qatar by Jean Nouvel. Sheikh Saud's own house, the Millennial House by Arato Isozaki and an array of projects by well-known architects, designers and artists were part of his multiple building activities at the time.

The Sheikh's objective was to create a distinctive skyline for Doha with a central defining feature similar to other international cities, with Hong Kong's skyline of towers mentioned as one inspiration. In this way, the Doha Tower would become the most important and visually distinctive of these West Bay towers that were, at the beginning of the 2000s, of middling architectural character. The Sheikh's strategy was, interestingly, not part of a rigorous urban planning effort but rather a highly personal mission that was implicitly supported by the Qatari government. While there existed major urban planning initiatives in Doha at the time, for example the planning of the Corniche, the Doha Tower was not specifically a part of these efforts.

B. How were the architects and specialists chosen?

In the early 2000s, Jean Nouvel was one of the leading architects of Europe with a number of buildings of note in his portfolio of completed works. His architecture earned him many honours, such as the Aga Khan Award for Architecture for his Institut du Monde Arabe in Paris, one of the Grand Projets of François Mitterand. He also gained cultural distinction through exhibitions such as that of his work at the Centre George Pompidou in Paris in 2001. It was this exhibition that would be a catalyst for the commission of the Doha Tower, as it was here that Sheik Saud, a frequent visitor to the Paris cultural scene, was exposed to Jean Nouvel's work in an extensive way. Specifically, this exhibition highlighted one of Ateliers Jean Nouvel's notable tall buildings, the Torre Agbar in Barcelona, Spain, that was also on the cover of the exhibition catalogue. This round, high-rise tower, one of the few examples of this typology in the world, one of interest to Jean Nouvel dating back to his unrealised Tour Sans Fins in Paris, became the impetus for a dialogue between Sheik Saoud and Nouvel that would lead eventually to the commission for the Doha Tower. The written record on his eventual selection remains vague, but interviews with Nouvel and lead architect Hafid Rakem revealed an iterative process between client and architect which we can define as a quasi-selection process, as the Sheikh became increasingly convinced by Nouvel's architectural concept for the Tower and,

also importantly, Jean Nouvel became personally confident in the Sheikh's ability to execute a costly and complex building project.

C. *General programme objectives*

The programme objectives at the beginning of a selection process that can be best described as collaboration between the client and architect were focused on the need for a tall building in Doha. This tall building would be part of a design for a skyline as per the client's objectives to initiate a modern urban identity for Doha. The programme of this tower was initially planned as commercial and government office space with individual floors for a restaurant and a residence during the concept design phase of the project in 2001-2003. Details of the programme did not change throughout the process, although the client requested a scenario that was later discarded for a number of floors dedicated to a luxury hotel. Nouvel's design also saw the Doha Tower as part of an urban design for the Corniche area.

D. *Functional requirements*

There was no formal architect's brief the project but rather a dialogue between architect and client occurred, one that formalised the functional requirements during a time period between 2001-2004. The client, Sheikh Saud, sought an architectural landmark for Doha and consulted with Jean Nouvel about many aspects of its design based on his interest for a round tower similar to Nouvel's Torre Agbar in Barcelona. A programme for a tower mainly dedicated to offices with the addition of a restaurant and a guest house was the initial requirement outlined in consultation with Jean Nouvel. This consultation included the need for a design with local architectural character and siting and planning within the context of Doha's Corniche seashore. The current site of the Doha Tower was one of a number of sites around the Bay of Doha considered and recommended by Jean Nouvel, with the aim of maximising the visual impact of the building as part of an urban vision for Doha, the Corniche and the West Bay skyline. Intriguingly, this strategic vision for the building as a symbol of modernity and Islamic Qatari culture became the most basic tenet of the architect's brief.

IV. Description

A. *Building data*

The Doha Tower is cylindrical in shape and measures 45 metres in diameter.

It is capped by a full-span dome and topped by a lightning conductor spire at a level of 231.5 metres above ground with a total built-up area of approximately 110'000 m² on 46 floors and three basement floors on a 13'000 m² plot.

Space for offices occupy floors from the mezzanine to the 44th floor with the top two 45th and 46th floors designated as a penthouse but currently only half-built and not occupied.

The floor area of the office floors ranged between 1'071 m² and 922.2 m², with an average of 1'053 m².

Current occupancy of the Doha Tower's 46 floors is on 24 floors plus the bank branch and café in the ground-floor lobby.

An atrium with panoramic elevators rises to the 27th floor, 112 metres high.

B. *Evolution of design concepts*

The Doha Tower is set on a rectangular plot adjacent to Corniche Road and Sheraton Park towards the Doha Bay and bounded on the city side within a zone delimited by Majlis Al Tawoon and Funduq Streets. The most dramatic design feature of the architecture is its round volume capped by a circular dome and spire at its top. This round Tower's external envelope and internal structure are the major visual elements determining the shape of the building. The two-part double facade consists of a steel screen of a geometric pattern based on a motif of traditional Islamic architecture with a glass and aluminium curtain wall behind. Behind this facade is the primary structural element of the Doha Tower, its reinforced concrete diagrid structure which is slightly visible from the exterior, but a major visual presence in the interior volumes and floors. The Doha Tower meets the ground through the transition element of a 25-metre-wide pergola that reaches to the garden and street level. The pergola also makes a valuable contribution to the control of wind forces onto the building, protecting the entry area.

The spatial organisation of the building is based on its circular floor plan bounded by the load-bearing diagrid on its exterior circumference and a rectangular structural core with elevators and utilities placed slightly off-centre. This general floor plan is used throughout the building except for the entrance lobby, first-floor mezzanine and two-floor, domed penthouse on the roof. The loadbearing interior diagrid permits for a column-free open plan space allowing for flexible office plans.

The circular shape of the building means that there is no visually dominant side to the Doha Tower at street level. The subtle driveway identifying the Tower's entrance gives this southern side a more distinctive presence but this is due to the fact that views from the surrounds of the Tower are obscured by neighbouring buildings. The other two sides of the building to the north and west have neighbouring buildings that block visual access from the city side. The Doha Tower's own service building, housing part of the service utilities and the entrance to the underground car park, also acts to obfuscate views of the building from the city side. This service building, fused with the half-built "fitness centre", building represents a part of the project that, while related in function, is considered by the architects as a separate design. The primary view of the Tower is from the east from Corniche Road and Sheraton Park directly in front and the Bay and old Doha further afield. Set in the front row of buildings in the West Bay, this building's siting is intended to accentuate and give a visual focal point to the skyline.

The primary concession to the site and desert climate in the building's architecture is the transformation in the density of the geometric exterior aluminium façade screen in filtering sunlight. This screen, based on traditional examples of Islamic architecture in Qatar, has more layers and hence more visually density on the east and south side to provide more solar protection. The geometry of this outer layer of the double facade of the Doha Tower is the most distinctive feature of the architecture visible from the exterior. Reflections off the steel and aluminium facade during daytime give way to dramatic lighting of the building at night that firmly establishes its visual dominance of the skyline, as the architect and client intended.

There were no strict regulatory limits to the height of the building resulting in its position on the eastern side of the plot being determined by the combination of its circular tower typology aligned with views of the building from all points of Doha Bay. The adjacent support-service building housing the parking entrance and other utilities allows the Doha Tower to have its pure circular geometric shape.

The building entrance at street level leads down to the base of the tower that has a 25-metre-wide pergola cantilevered over the circular driveway to provide a shaded entry. This circular internal road is flanked by an angled grade of landscaped gardens that slope down to the lobby entrance, providing a natural park-like oasis in the urban setting. This landscaping covers 40% of the site, providing the primary public experience

of the building in connection with the lobby. The main lobby also contains the large vertical interior atrium that houses eight glass elevators reaching a height of 112 metres up to the 27th floor.

C. *Structure, materials, technology*

Structural systems

The Doha Tower is constructed of reinforced concrete typical of many of the commercial towers of the West Bay of Doha. The primary vertical load of the building is placed on a diagrid “tube” of canted round columns forming an X-shaped structural frame at the perimeter of the circular floor plan that also takes 75% of the lateral wind-bracing loads. These interwoven diagonal reinforced columns with an eight-floor module tapering slightly at the top are located in the interior space of the Doha Tower and take up the primary load of the building, with further structural support provided by the rectangular central core and post-tensioned ring beams at every level. This diagrid structure allows for three-metre floor heights and open floor space. The steel and glass dome at the top of the building has a crisscrossing lattice-steel structure distinct from the diagrid columns. The three-floor basement of the Tower, one of the first basements of this size in the West Bay, housing an 800 vehicle parking facility, was produced using secant piling process and during an extensive de-watering period.

Materials

Structural members are steel-reinforced concrete diagrid columns, loadbearing walls and composite steel-beam floors. The facade’s screen pattern is comprised of aluminium “butterflies” at four different scales. The building’s structure and screen are exposed, making these materials an important, structurally expressive, aspect of the architecture.

Infill materials

The aluminium and steel exterior screen and glass facade of the building and lack of internal walls results in a building with very little infill material. The open-plan office floors also decreased the need for infill materials, allowing each tenant to create their own open-plan office designs.

Renderings and finishes

Internal walls are mostly in fair-face concrete with additional walls in plasterboard painted white. Floors in public spaces such as the lobby and elevator lobbies are in galvanised-steel-faced floor panels which are also repeated in the ceiling of the lobby. The overall combination of grey concrete surfaces, galvanised steel flooring/ceiling, and steel and glass facade gives the building a cool industrial design character in combination with an emphasis on space and light. The design of these interiors was in part based on the client Sheikh Saud’s desire for such a sharp, industrial aesthetic.

Construction technology

Construction technology was a result of the abilities of the general contractor, China State Construction Engineering Corporation Ltd., coordinated with the architect Jean Nouvel’s novel design for a round-tower typology based on the aluminium, steel and glass facade and diagrid structure. The structural engineering required for this unique combination of features was largely realised by China State’s engineers primarily located in China who performed many of the structural calculations. Assistance was provided by the China Academy of Building Research who performed additional wind and material studies. There was also

significant contribution in structural engineering by Terrell International, working in consultation with Ateliers Jean Nouvel during the design phase, and on site during construction by Socotec. For the facade, design studies were performed by BCS of Neuchâtel, Switzerland.

Building services, site utilities

The Doha Tower is one of Doha's premier office buildings and probably can be seen as the most important commercial building in the city. As such, the building has highly advanced services for exterior/interior lighting, heating/cooling, security, fire prevention, building management, fresh-air distribution, electricity, telecommunications and elevator access. Despite the shading and energy efficiency provided by the screen facade, there were significant energy needs of the building housing high-end office space. This energy requirement is primarily generated by the cooling system in the desert climate, requiring a robust system which contains high-tension switchgear (11 kV), 10 No power transformers (1250 kW each), and low-tension switch-gear that feeds all the systems and utilities in the Tower. Despite the presence of a district cooling system for West Bay (built and developed in the 2000s in parallel with the Tower's construction), Doha Tower still maintains its own air-conditioning and fresh-air system. The central cooling system uses chilled water from nine chillers to ensure moderate temperatures through two air-handling units on each floor handling the cold air, and achieving a low level of noise by using sound attenuators on the air supply and return attached to these two units.

There is also an advanced elevator system using a technique that controls and guides visitor using a destination control system provided with 23 elevators in multiple locations. And, lastly, there is a 231-metre-long exterior LED lighting system to illuminate the building at night and create different colour/pattern combinations for the Doha skyline, an important design feature of the building.

D. Origin of

Technology

The technology of the building was largely secured through China State Construction's Chinese-based sources. The most visible of these is the steel, aluminum and glass facade fabricated in China. The building's primary technology systems beyond these structural elements, in electric, air conditioning, elevators and lighting, were sourced through major European manufacturers and suppliers making the building a hybrid of European and Chinese technological products and Chinese/French/Swiss engineering.

Materials

Glass, steel, aluminum and concrete are the primary materials of the project with steel as undoubtedly the most important material in the project. Steel-milling for the project was performed through two separate companies in China. The steel structure that includes the steel structural canopy and the steel-structure dome (forming the internal structure of the dome and canopy) was manufactured by Hebei Jinhuan Steel Structure Engineering Co. Ltd. of Hebei, China.

Zhu Hai King Glass Engineering Co. Ltd was the fabricator of the aluminum and glass that forms the facade as well as the aluminium "butterflies".

Concrete work was done on site with cement procured from local distributors. The reinforcement steel for the concrete was also sourced locally.

Labour force

The general contractor China State staff of designers, architects, engineers, logistic staffs, administration officer, etc. totalled 50-60, among them around 40 of whom are Chinese. The remaining were sourced via local recruitment and came from countries such as Singapore, UK, Malaysia, India, Pakistan. The MEP subcontractor, SAMKO, with a staff of 10-15 came from Turkey and sourced additional labour locally in Qatar.

The labour force for the structure, finishing, facade and steel-structure works consisted of 300/400 construction workers, with 80%-85% coming from China and the other 15-20% from Bangladesh, Nepal and Thailand.

Professionals

Architectural team: Jean Nouvel – Ateliers Jean Nouvel (Paris, France)

Leaders:

- Execution: Hafid Rakem
- Project: Ingrid Menon, Hafid Rakem
- Assistants: Marie-Hélène Baldran, Vincent Laplante
- Architects: Emmanuel Biard, Antoine Bordenave, Gian Luca Ferrarini, Lina Ghotmeh, Nick Gilliland, Eva Grimard, Nicolas Laisne, Marie Maillard, Stefan Matthys, Barbara Sajgalikova, Carmen Salinas, Anna Sans, Anne Traband, Elodie Vade pied, Camille Vidal, Nives Voinov, Nabila Zerrouki, Anna Voeller

Lighting design: Aik (Yann Kersale)

Engineers execution:

- Structure: Socotec International (Alain Sabah)
- Building services: Ian Banham & Associates (IBA)
- Project: Structure & Building Services: Terrell International

Consultants execution:

- Cost consultant: Gardiner & Theobald International (Chris Mentell)
- Construction supervision: Gleeds Gulf Engineering Consultants, M. Douglas Bayley (Project Manager), M. Mamoon Atout (Construction Manager), Dar Al Handasa, M. Hani Akkawi (Project Manager), Socotec M. M. Alain Sabah, Ian Banham & Associates

Facades: BCS SA
Security: Socotec International
Cost consultant: Europtima
Acoustics: Avel Acoustique
Parking: Jean-Pierre Mole SA
Kitchen: Pluriconsult
Surveyor: MTC Surveys
Landscape: Ingénieurs Et Paysages (Jean-Claude Hardy)

Contractor: China State Construction Engineering Corporation Ltd.

Sub-contractors:

- Steel Structure: Hebei Jinhuan Steel Structure Engineering Co. Ltd, Hebei, China
- Aluminum facade and glass: Zhu Hai King Glass Engineering Co. Ltd, Zhuhai, China

V. Construction Schedule and Costs

A. *History of project design and implementation*

Design: July 2002 – July 2003
Construction: August 2004 – March 2012
Completion: 2012

B. *Total costs and main sources of financing*

Construction cost: 186'849'315 USD = 680'131'506 QAR
Price of land: 22'739'726 USD = 82'772'606 QAR

Exchange rate used: 1.00 USD = 3.64 QAR

Initially, the main source of financing of the project was through Sheikh Saud via his position in the Qatari government, providing him the necessary capital from the Qatar National Bank that included rental commitments for the Doha Tower by government tenants such as the Ministry of Foreign Affairs (not realised). Later on in construction, in about 2005, the client, because of his weakened position in the Qatari government hierarchy, was compelled to secure additional finance from the Commercial Bank of Qatar to complete the building. The initial proposal by China State for the construction at around 120 million USD (437 million QAR) were seen as a below-cost bid by the contractor and required an amendment during the construction process.

C. *Comparative costs*

The average construction cost in Doha, Qatar, in 2015 is reported to be around 1'950 USD (7'098 QAR) per m² for a owner-occupied, high-rise office tower considering the net office area. For the Doha Tower at its completion in 2012, the cost of construction was 3'736 USD (13'599 QAR) per m² based on the net area of the offices, meaning that Doha Tower's comparative cost was significantly higher than other office towers of Doha.

D. *Maintenance costs*

The cost is 218'000 USD (794'000 QAR) monthly for all hard and soft maintenance services, paid to the management services company.

Charges for water and electricity provided by Kahramaa, the government utility company are approximately 82'000-110'000 USD (300'000 to 400'000 QAR) monthly, depending on the season.

E. Ongoing costs and “life performance” of building

The building’s maintenance is outsourced to an international facility-management company who maintains the building’s mechanical, electrical, water, security, air, elevator and cleaning services. Currently, maintenance of the public areas of the building is minimal with only the large exterior garden requiring two full-time gardeners.

The building is guaranteed a long-term life span due to the expense paid for its high quality aluminium, steel and concrete work and finishing.

VI. Technical Assessment

A. Functional assessment

The Doha Tower as an office tower is considered one of the prime office buildings of Doha and Qatar, if not the most prestigious. Tenants in the Tower are paying some of the highest rental rates for commercial office space, above the average rate of 60 USD (215 QAR) per m² monthly. The high cost of rent has resulted in tenant occupancy in March 2016 of 24 of the 42 available office floors at a rate of 57%, slightly below the prevailing rate of 65% for commercial office buildings in the West Bay. This lower level of occupancy could be seen as the building not fully realising its primary programmatic function, despite its leading status and visibility. The environment around the Doha Tower is very subdued during the day at street level, while in the lobby, aided somewhat by the acoustics of the exposed concrete and coated-steel panels which suppresses echoes and noise, there is generally a low level of sound.

Based on site interviews, while most the building’s tenants find the building meets all the needs of its corporate clients, some office workers were critical of the exterior screen blocking views and the inability to open the windows, describing the office space in a negative way as “hermetically sealed.” Other office workers in the building praised the building’s modern appearance and services, especially mentioning the interesting screen as a highlight of their office experience.

The lobby as a public space is primarily a transit area with no activity that is serene in character. This reality has been only slightly altered recently by the opening in late 2015 of a small café in one of the retail spaces in the lobby that has increased visitor access to the building somewhat and provided interior and exterior seating. The café’s outdoor terrace area is the preferred location for cigarette smokers who congregate here next to the sloping landscaped garden and driveway. This circular drive, paved in textured cement blocks, is covered by a glass and steel 25-metre-wide pergola providing shade in combination with the surrounding landscape of small bushes and trees, home to a few street cats. Although there is a space accessible to the general public, the lobby, café, driveway and garden are primarily used by office workers of the Doha Tower (although there are plans to host exhibitions in the lobby and mezzanine spaces). The lack of public circulation is due to the fact there is no signage identifying the building and no wayfinding aids to direct pedestrians from the street to this public area, thus limiting its use despite it being one of the largest natural and climatically hospitable outdoor areas in this section of the West Bay. The building, while a major visual presence, hides its access points discreetly from the surrounding city.

B. Climatic performance

The aluminium screen of the Doha Tower is the most visible element of the climatic performance features of the Doha Tower. This brise-soleil screen, inspired by the traditional Islamic mashrabiyya used for shading

or room-dividing, is composed of four scales of a butterfly-shaped aluminum tile. The geometric pattern at several scales is overlaid at different densities along the facade in response to the solar conditions: 25% opacity was placed on the north elevation, 40% on the south and 60% on the east and west, generating a subtle variation in the geometry and external appearance of the screen. The glass of the inner-layer curtain wall is slightly reflective so as to help reduce solar gain. Finally, solar blinds located behind the curtain wall can be controlled in the interior of each office.

C. *Response to treatment of water and rainfall*

The Doha Tower does not have significant water rainfall issues because of the desert climate. Advanced water supply and waste-water systems are in place in the Doha Tower.

D. *Environmental response*

The Doha Tower building was constructed on a desert plot that was previously unoccupied with extraordinary natural conditions, lacking significant native flora and fauna. In its current state, the siting of the building on the plot occupies 60% of the land area with the remaining area for the sloping garden and driveway. The neighbouring service building, the half-built “fitness centre” and an unused parcel between the Doha Tower and the adjacent tower round out the remaining parts of the built-up urban context which, due to the half-built “fitness centre”, also by Jean Nouvel, is still a work in progress.

E. *Choice of materials, level of technology*

The Doha Tower in steel and concrete is typical of many of the tall buildings of the West Bay. The most dramatic difference is the choice of the aluminium screen of the double facade that gives the building a decidedly unique appearance in contrast to the glass or concrete facades of the adjacent towers. The choice of aluminium for the motif of the screen has the effect of localising the building with an Islamic motif made possible by advanced digital fabrication and construction techniques realised in China. This combination of tradition and contemporary technology is an important differentiating factor of the building in the West Bay. Along with the dramatic diagrid structure, the screen generates a novel architectonic condition where structure and facade are the dominating aesthetics of the building. The mix of European and Chinese structural engineering that went into the project resulted in this combination of material and technology for this unique round, tall building typology.

F. *Response to, and planning for, emergency situations*

The building’s most important emergency situation is for fire. As such, advanced detection, alarm, evacuation and sprinkler system have been installed in the building. All Tower areas are covered with an effective fire-alarm system, together with a voice system in case of evacuation with dedicated links to the lifts, doors, fans, gates, barriers etc., to make the way clear in case of an evacuation. The Tower is served by an automatic sprinkler system that is sensitive to flames and functions in the event of fire. Each floor includes two escape routes that are fire- and smoke-resistant. The Tower has been equipped with huge fans that extract the smoke from fire-affected areas and pressurise air to the upper and lower levels to prevent smoke transfer to unaffected areas, so ensuring safe evacuation of the occupants from the building while the smoke is discharged outside the building.

G. *Ageing and maintenance problems*

At this point, four years after completion and the beginning of the occupancy of the building, there are no visible ageing problems. In the long term, the crucial issue will be the maintenance of the facade. The double facade with aluminium screen, walkways and glazing has many different parts that, in the long term, will present problems as individual pieces degrade at different times, including the thousands of rivets, bolts and spacers that hold the screen together. Currently the most visible maintenance problem is the cleaning of the glass on the facade, which needs constant work in the dusty climate. Although hidden from exterior views behind the aluminium screen, dust build-up on the glass windows is clearly visible from the interior offices. There is also the glass of the dome on top of the building which presents cleaning issues due to its height and angle.

The building's interior public areas in concrete and especially the scratches on the galvanized-steel floor panels are starting to form a patina through use that has its own aesthetic. And, lastly, the architect's specification to use a continuous surface with minimal breaks on the dropped ceiling requires that the ceiling be cut open and patched each time maintenance work on utilities behind it are needed.

H. *Design features*

The circular Doha Tower dominates its plot on the skyline of the West Bay behind the Corniche. As a design statement, the building's silhouette during the day is the most dramatic part of the West Bay skyline due to the aluminium screen that reflects sunlight off of its aluminium surface distinctly, giving the building a cohesive massive appearance. As the West Bay has developed and become more dense with time, the visual impact of the Doha Tower has lessened somewhat as more buildings have been built around it. The convex curve of the Doha Tower, especially in relation to the concave Tornado Tower behind it, is perhaps the most intriguing aspect of the formal relations between the West Bay towers. In the evening the situation changes dramatically, when the lighting of the full facade of the Doha Tower is turned on and its light show dominates neighbouring buildings, making it the clear centre of the Doha night.

At street level, the circular tower with its aluminium screen is more dramatic in contrast to neighbouring buildings. The details of the aluminium screen present the intricacies of the geometric design motif up close in the urban context, making it more vivid and sculptural when compared to the simple orthogonal geometries of the glass surfaces of the neighbouring buildings.

I. *Impact of the project on the site, in terms of increased circulation or vehicular movement, changes required for infrastructure (particularly for projects in high-density areas), etc.*

The Doha Tower is not a high-circulation building despite its location in the dense West Bay area. The parking entrance located in the neighbouring service building restricts vehicular circulation directly in front of the Tower. While Corniche Road directly in front of the Tower is a high-traffic main artery of the city, the vehicular circulation there does not have a serious impact on access to the Tower from the side street. The main entrance below street level hidden underneath the pergola restricts pedestrians' accessibility to the public lobby.

J. *Durability and long-time viability of the project*

As discussed earlier, the Doha Tower is currently at above 50% occupancy for its office floors. Long-term viability of the office market of Doha makes the building's future sustainable as long as the current professional

management of the Doha Tower's sales, marketing and facilities teams continues, and the technology of the mechanical/electrical/structural systems are well-maintained. The building's aluminium-screen sheath protects the glass facade and the building somewhat from the harsh desert climate, but its long-term viability will only become apparent in 10 or 20 years' time, as the feature is unique to this Tower.

K. *Interior design and furnishing*

There are no furnishings in the interior design. The extension of the cool metallic aesthetic of the galvanised-steel floor panels has been extended to the ceiling panels, elevator interiors and service/bathroom doors in a highly detailed manner. The geometric motif of the aluminium screen is repeated in the interior, most visibly in the elevators and floor panels.

VII. Users

A. *Description of those who use or benefit from the project*

Those who benefit most from the project are the general population of Doha, through its unique appearance on the skyline and within the urban context of the West Bay. The unique design of the rounded Tower gives it pride of place in Doha as a prestigious example of advanced architecture and design for the city and the country. This is of general benefit to Doha, as it is one of a number of buildings of architectural distinction on the Bay of Doha, including the Sheraton Hotel, the Museum of Islamic Art, the National Museum of Qatar and the Msheireb Downtown Doha that are starting to generate an urban character for Doha.

Some of the office workers in the building are aware of the architectural distinction of the project and in interviews expressed the "honour" and "pleasure" they have in working in a building with this unique architecture. Office workers pointed out the framed vistas and varieties of sun/shade provided by the aluminium screen as an important design feature in the office spaces that they appreciate.

B. *Response to project by clients, users, community, etc.*

What do architectural professionals and the cultural "intelligentsia" think about the project?

The project has had a muted response from architectural professionals considering its unique typology, size and stature in Doha. For example, the Doha Tower has received much less coverage in global architecture press than the Burj Khalifa Tower by SOM in Dubai. Globally, architects recognise it as the continuation of Jean Nouvel's interest in round towers starting with the unrealised Tour Sans Fins in Paris and the Torre Agbar in Barcelona and the revisiting of facade technology for Islamic cultures seen at the Institut du Monde Arabe in Paris. The Doha Tower's limited office programme and the death of Sheik Saud in 2014 have perhaps contributed to the lack of visibility for the building in international media and architecture circles.

The Doha Tower did win the Best Tall Building Worldwide in 2012, awarded by the Council on Tall Buildings and Urban Habitat, Chicago, which specifically mentioned that is the first tall building to use reinforced-concrete diagrid columns internally.

Locally, architects have recognised the aluminium screen motif as a contribution to an indigenous Islamic language for architecture.

What is the popular reaction to the project?

It is interesting to note that the Tower is used repeatedly in photographs of Doha as one of the key icons of the city, fulfilling the initial client brief by Sheikh Saud and Jean Nouvel's design intent. It is most visible in night-time images of the city, where its exterior lighted skin shines dramatically in a bright red-orange color.

Popular reaction to the project has centred largely on the phallic shape of the building. This connection is repeatedly mentioned in conversations with local pedestrians, taxi drivers and café/shop workers.

What do neighbours and those in the immediate vicinity think about the project?

The building lacks a direct neighbour. The completion of the half-built "fitness centre", also by Jean Nouvel, will give the building a distinct neighbour, and increase pedestrian circulation in the area, in some senses completing the Doha Tower project as a whole.

Office workers in surrounding towers see the building as "another office building" in the West Bay, although one that is more dramatic in its appearance and hidden from view in terms of access. There is very little street pedestrian activity directly in front, either on Corniche Road or on the side entrance street, to give the building a more meaningful identity or presence in the urban context of the West Bay

VIII. Persons Involved

Client: Saud bin Mohammed bin Ali bin Abdullah bin Jassim bin Mohammed Al Thani

Architectural team: Jean Nouvel – Ateliers Jean Nouvel (Paris, France)

Leaders:

- Execution: Hafid Rakem
- Project: Ingrid Menon, Hafid Rakem
- Assistants: Marie-Hélène Baldran, Vincent Laplante
- Architects: Emmanuel Biard, Antoine Bordenave, Gian Luca Ferrarini, Lina Ghotmeh, Nick Gilliland, Eva Grimard, Nicolas Laisne, Marie Maillard, Stefan Matthys, Barbara Sajgalikova, Carmen Salinas, Anna Sans, Anne Traband, Elodie Vade pied, Camille Vidal, Nives Voinov, Nabila Zerrouki, Anna Voeller

Lighting design: Aik (Yann Kersale)

Engineers execution:

- Structure: Socotec International (Alain Sabah)
- Building services: Ian Banham & Associates (IBA)
- Project: Structure & Building Services: Terrell International

Consultants execution:

- Cost consultant: Gardiner & Theobald International (Chris Mentell)
- Construction supervision: Gleeds Gulf Engineering Consultants,
M. Douglas Bayley (Project Manager),
M. Mamoon Atout (Construction Manager),
Dar Al Handasa, M. Hani Akkawi (Project Manager),
Socotec M. M. Alain Sabah, Ian Banham & Associates

Landscape: Ingénieurs et paysages (Jean-Claude Hardy)

Contractor: China State Construction Engineering Corporation Ltd. (Zhong Jihou)

IX. Bibliography

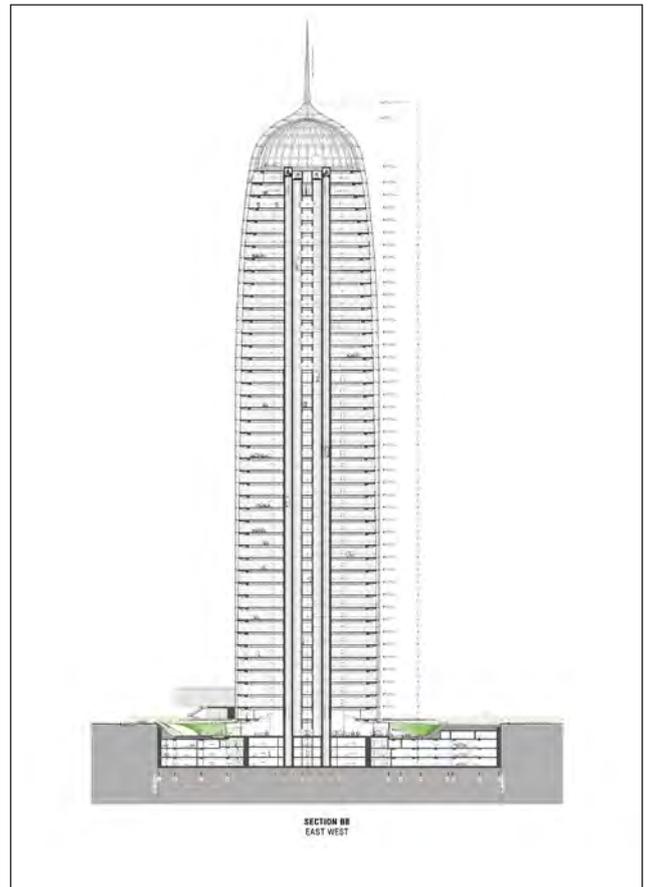
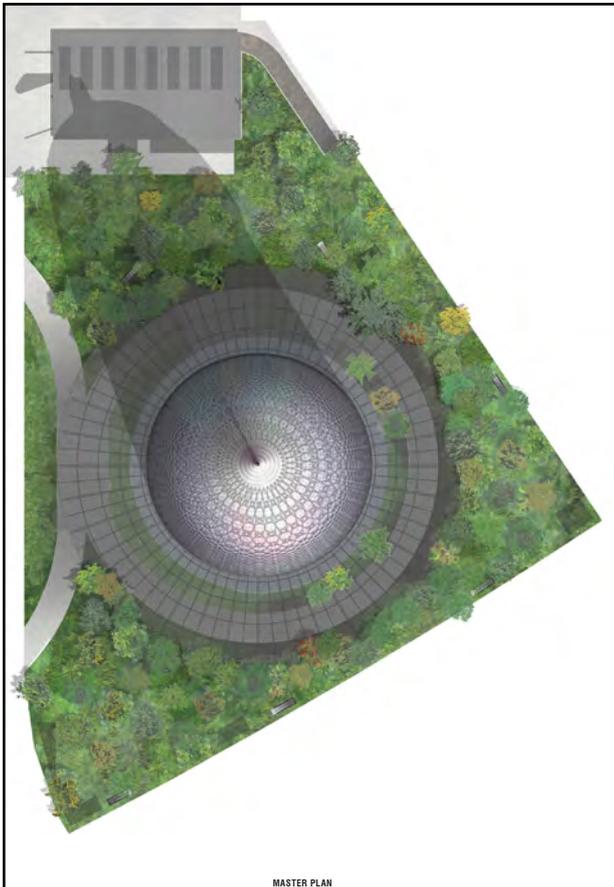
Boake, Terri Meyer, The evolution of tall building in the Gulf: from the sensational to the sensitive, *Architectural Design*, Jan/Feb 2015, pp.54-71

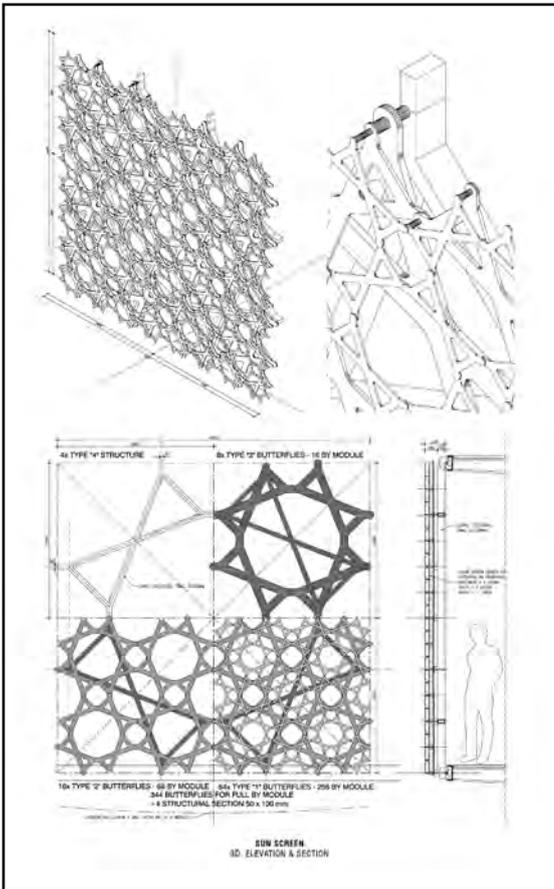
Boake, Terri Meyer, Diagrid Structures: Systems, Connections, *Details*, 2014

Boissière, Olivier, Jean Nouvel: Doha Tower, Doha, Qatar, design 2002-03, construction 2004-07, completion 2011, *GA document*, 126, Feb. 2014, pp.23-41

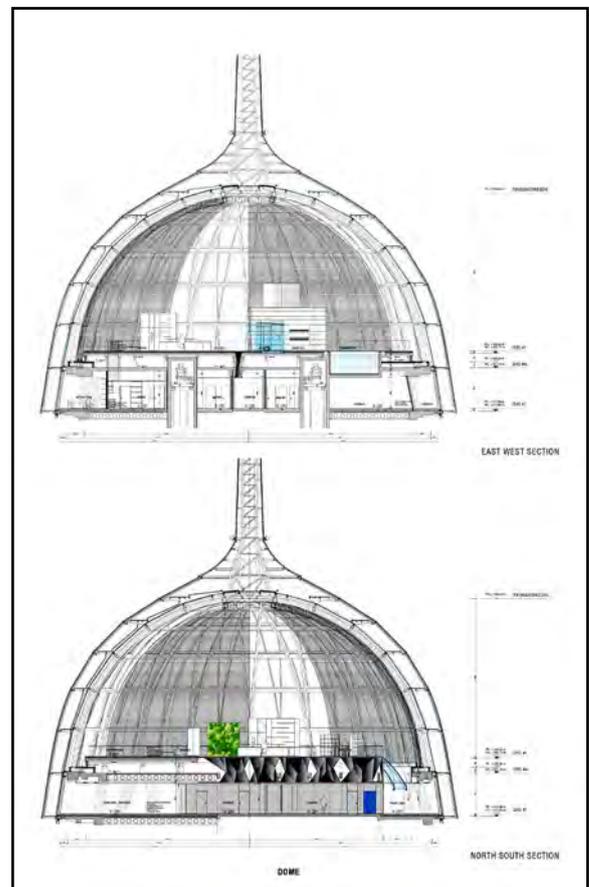
Jodidio, Philip, *Architecture in the Emirates*, Taschen, 2007

Gökhan Karakuş
May 2016





Details of the sun screen structures.



Dome sections.



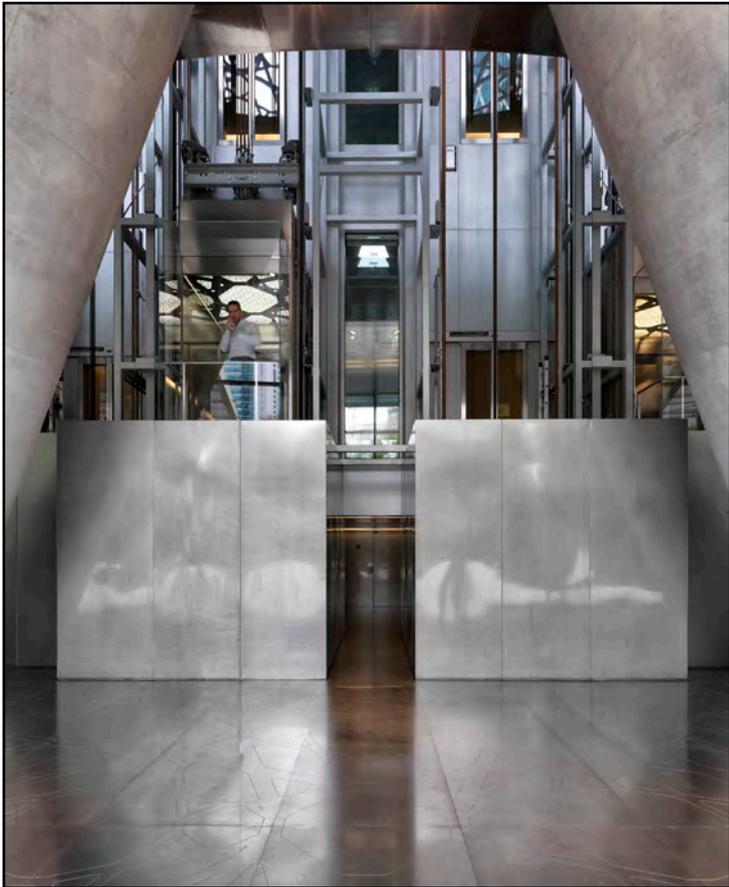
The facade's screen pattern is comprised of aluminium "butterflies" at four different scales. This brise-soleil screen, inspired by the traditional Islamic mashrabiyya. The geometric pattern at several scales is overlaid at different densities along the facade in response to the solar conditions.

The Doha Tower meets the ground through the transition element of a 25-metre-wide pergola that reaches to the garden and street level. It also makes a valuable contribution to the control of wind forces onto the building, protecting the entry area.





The primary vertical load of the building is placed on a diagrid “tube” of canted round columns forming an X-shaped structural frame at the perimeter of the circular floor plan.



A rectangular structural core with elevators and utilities is placed slightly off-centre. It provides further structural support to the columns and allows for three-metre floor heights and open floor space.



The open-plan office floors also decreased the need for infill materials, allowing each tenant to create their own open-plan office designs.

The steel and glass dome at the top of the building has a crisscrossing lattice-steel structure distinct from the diagrid columns.

