Wind Tower Houses in Dubai

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wind tower meaning of cultural identity | sustainabilty | cultural Heritage | local architecture | adaptation | urban conservation

1. Introduction

Due to the similar climate conditions and proximity of the United Arab Emirates to other neighboring countries such as Iran and India, who have been familiar with the use of wind towers as cooling devices for a long time, wind towers were readily adopted in traditional buildings in the UAE. The most concentrated number of wind towers can be found in the residential neighborhood of Dubai called Alfahidi Historic Area. The number reaches around 50 wind towers in less than 0.25 km^2, with an average of one wind tower per house. This neighborhood was originally designed for merchants who immigrated from Bastak in Iran. Later, wind towers were applied to various different types of buildings, such as shops and stores, as well as other residential neighborhoods of Shindagah and Deira.

Although there are some differences between the wind towers applied in Iran and those in Dubai, in terms of the number of openings, material, and building techniques, they still share the same functional significance, conceptual design, and geometric decoration [1].

In Dubai, wind towers can be divided according to their construction material or their form:

- Used construction materials. Wind towers were built from either coral stone or sea shells brought from the sea. Heavy-duty canvas is also used by people who cannot afford coral stone.
- Architectural form. Most wind towers have a square horizontal section divided diagonally into four parts, in order to catch the wind from any direction. In some cases, where the wind tower sits on a rectangular section, a beam is built to divide the space and to make sure the base of the wind tower sits on a square section. One can also

find rare example of round-section wind towers, such as one found in Sharjah, which is said to have an Indian influence.

Wind towers later became one of the most important architectural elements characterizing traditional architecture in Dubai until the beginning of 1960s. People during this time, because of their prosperity, left their traditional houses for more modern ones that addressed their contemporary needs. At present, most traditional houses are kept and protected by the Dubai Government through an adaptive reuse initiative. The wind towers of these traditional houses have been physically restored, but no longer work as cooling devices. The Dubai Municipality, since 1990, has worked hard to document, preserve, and manage historic areas. A total of 315 buildings are listed as protected, most of which feature wind towers. Preserving these houses means naturally preserving their architectural elements, where wind towers are one of the most significant elements characterizing traditional architecture in Dubai. The wind towers were restored according to the international standard with great sensitivity; see **Figure 1** and **Figure 2**.

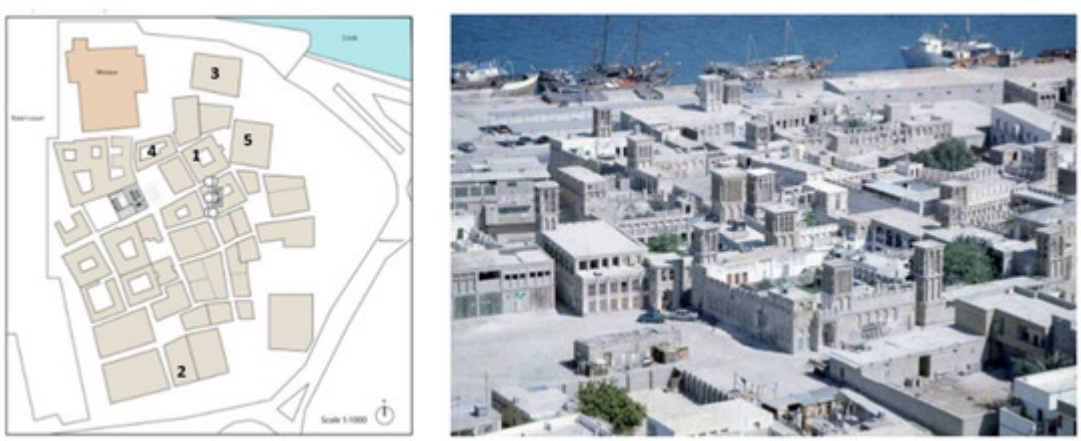

Figure 1. (**Left**) Site plan of Al Faheidi Historic area in Dubai. (**Right**) Areal image of the area in the 1970s. Source: Dubai Municipality.

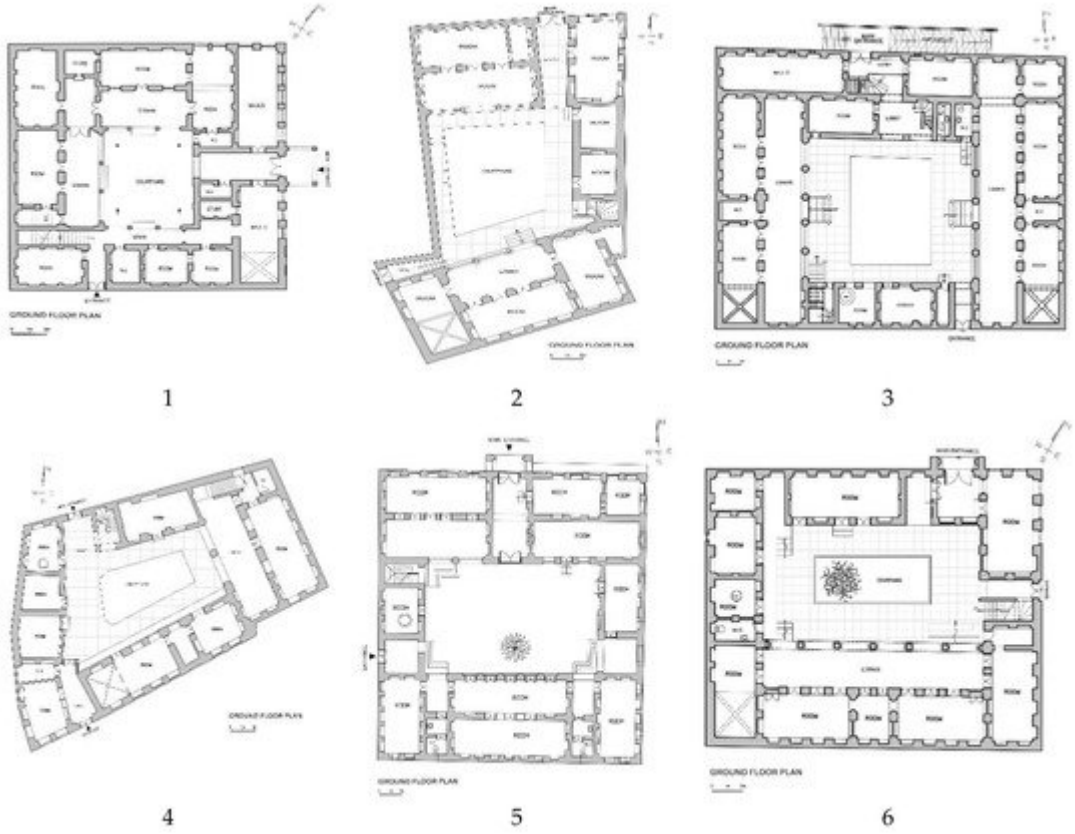

Figure 2. Plans of wind tower houses in Dubai, showing their locations (indicated with cross section). (**1**)-House of Abdul-Rahman Farouq. (**2**)-House of Mir Abdel Wahid MIRI. (**3**)-House of Mohammed Sherif Al-Olama. (**4**)-House of Mohammed Saleh Fikree. (**5**)-House of Abdul-Razzaq Al-Bastaki. (**6**)-House of Abdulla Mohammed Al-Bastaki.

According to Roland Hawker, courtyard wind tower houses, as an architectural type, are not an ancient indigenous tradition to the Trucial coast [2]; instead, “It is an entirely new form that reflects the tremendous impact of pearling industry on the coastal communities of the Trucial coast”. Wind towers are thus an architectural expression resulting directly from the increasingly international commercial, trade exchange, and social conditions of the late nineteenth century. The popularity of this form of house at the beginning of twentieth century has been mentioned and associated with the pearl industry elsewhere [3].

The documented construction of wind tower houses in Coles and Jackson offered very useful information about Persian merchant families in Alfahidi Historic Area (which used to be called Bastakiya) [4]. The house was constructed in phases, with wings surrounding an open court. This form of the house is typical of the Alfahidi historic district, and was later adopted in the Sheikh Saeed Al Maktoum house in Shindagha, as well as in Sharjah, Um Al Quwain, Jazeerat Al-hamrah, and Ras Al-khaimah.

Wind towers comprise a remarkably practical response to particular physical conditions. What makes wind towers unique in Dubai is their ability to evolve in response to new environmental constraints, which are different from those in the Persia. Wind towers probably originated as a response to the very dry and hot climate of the southern desert margins of the Persian Plateau. This climate condition is not the same in the Gulf region, which is both hot

and humid. To be effective in a relatively more humid environment, it is desirable for a wind tower to provide a large volume of strongly flowing air down to the building it serves. Gulf wind towers were designed in such a way to achieve this. To increase the cooling effect of the breeze within the house, wind towers were ideally combined and integrated with already-existing traditional environmental systems to obtain maximum comfort. The tradition of using the terrace at the roof to catch the cool breeze at a higher level, as well as air pullers—which are openings that allow only air to enter the room and avoid the heat caused by direct sunlight—is an indigenous practice that was adopted before the introduction of wind towers.

The interpretation of wind towers through time is a result of integrating functional, social, economic, and architectural facets. These facets act with different intensities, allowing the wind tower to become one of the strong physical expressions that identify non-local architecture and the national identity of the Emiratis.

2. Functional Facet: Wind Tower as a Cooling Device

Throughout history, wind towers have been introduced as architectural devices for the purpose of achieving thermal comfort inside buildings. A wind tower is a vertical vent that has an opening from the top oriented towards the direction of the wind. The opening could be uni-directional, bi-directional, or multi-directional. It creates good air circulation, as it catches the cold wind from outside and directs it into the space below. Additionally, the wind tower also works as a filter, cleaning the air from sand and dust. The wind tower is also considered an important bio-climate tool in hot, arid climate cities, where air circulation is needed most. It has also an air-cooling effect during the night. In summary, wind towers have the following functions:

- Provides air circulation and replacement to achieve natural ventilation;
- Provides convenience and human comfort, working like a fan; and
- Provides evaporative cooling (the ‘felt’ temperature under a wind tower is 5–7 degrees less than the exterior temperature).

The wind tower efficiency increases according to its height: the higher, the more efficient. Normally, the height of a wind tower does not exceed 15 m. The height should also not be less than 2 m above the floor. The wind tower is only needed in the summer. In winter, the owner of the house covers the vent with a cloth (or the like), in order to prevent air and dust from entering the interior of the room.

According to Peter Jackson, the wind speed and orientation influence the efficiency of a wind tower. It was concluded that wind towers work more efficiently when the wind speed is high and it enters the wind towers at an angle of 45° [5]. The higher the tower, the longer the time spent by the air in a narrow area (narrower than the area in the exterior atmosphere), the faster the velocity of the air entering the room, and the cooler the residents beneath the tower feel. Closed doors and windows are seen to increase the effectiveness of wind towers. Such an act creates a controlled environment for the wind tower to function. The orientation of the room in relation to the

orientation of the tower, affects the efficiency of air movement in the room. If the wind is blowing from the north and the long axis of the room is aligned from north to south, good ventilation can be obtained. In contrast, if the long axis of the room lies east to west, then the air stream collides with the interior wall, reducing its momentum.

3. Social Facet

Wind towers also have social facets. The number and location of wind towers in the house define the importance of the rooms beneath them. A room with a wind tower is mainly used by the elderly or the head of the house. Wind towers also offer a space for family members to enjoy their time under the Barjeel, where many sleep and rest below, or even pray. The number of wind towers also indicates the social status of the owner of the house. This is because not many people can afford to have more than one or two in their house.

In Dubai, wind towers carry a particular message about the structure of the society and the social status imported by the pearl trade. Wind towers have been used to particular effect by the ruling classes of Dubai. With their inherited lineage positions, the highest political class was occupied by the sheikhs: a tribally constructed authority allowed the sheikhs to capitalize on the nineteenth century boom economy [6]. They waived customs taxes on imports and collected revenues informally from merchants. The sheikhs and their families monopolized the ferry services across the creek, land taxi services, and all taxi services between Dubai and neighboring Sharjah. In return, the sheikhs maintained security for all of the Emirate’s residents. When Sheikh Saeed Al Maktoum built a new house for his family in Shindagha overlooking the creek in 1896 (and when it was expanded later), three wind towers were introduced. The open courthouse with a wind tower, as a type, was also adopted for most houses in Shindagha, especially those originally built from Areesh. The gradual shift in architectural typology can be traced through replacing the watch tower, with the significance of a defensive expression, with wind towers in most houses of the royal family built in the Shindagha historic area.

4. Symbolic Facet

The social and the symbolic facets were very significant during the early period of introducing wind towers in Dubai, as they are today. When wind towers were first introduced, they were used not only as a functional cooling device, but also as a tool to identify the social status of both the wealthy immigrating merchants and the royal family who controls commerce and trade in Dubai. At present, wind towers comprise a defining element in contemporary traditional architecture and a strong conceptual representation of the cultural identity of the UAE.

The connotation of wind towers as a symbolic element is commonly expressed in the contemporary architecture of Dubai and in other states of the United Arab Emirates. This expression covers a wide range of manifestations, consisting of commercial, public, and residential uses. One can find many modern buildings whose elevations mimic traditional ones, having the same design as a wind tower, including the proportion of openings and decorations. The Dubai Municipality has encouraged clients and developers to refer to the design guidelines of traditional style in their architectural design solutions. Although these guidelines are not compulsory, most clients

have followed them and were happy to have them decorating their facades. For example, in the luxurious villas in Jumairah residential neighborhood, or in big mixed-use developmental projects such as the cultural village in Jaddaf. Culture Village, as it is commonly referred to, is a waterfront development near Al Jaddaf along the Dubai Creek. The village is spread over 3.7 million square meters, and will include many residential towers. Culture Village was launched in 2006. In their website, they refer to the use of authentic style for promotion and marketing:

“As the name implies, the development aims to preserve and celebrate the traditional art and culture of the United Arab Emirates. Therefore, every project displays the true colors and designs significant of Islamic architecture. To preserve and showcase the rich history and culture of the region many visual and performing art centers, museums and literary societies have been planned.”

One can find many newly constructed villas which were inspired by traditional architecture in other emirates as well. The Yas north residential area in Abu Dhabi, a newly built residential area targeting the local community, is one such example. At present, wind towers have been extensively used in luxurious hotels and resorts. Hotel St. Regis in Abu Dhabi and Mina Asalam hotel in Dubai are fine examples. All this reflects the revival movement of local traditional architecture, which strongly contributes to the physical urban identity and character. Wind towers, as an architectural reference element, have served as an inspiration for many famous architects in their designs. One of the most well-known architects is the famous Italian architect Vitorio Minervini, who is known for designing skyscrapers in Dubai inspired by the design of wind towers. At present, one can find several architectural building facades and conceptual design solution based on integrating traditional knowledge with advanced technology in other Gulf countries; examples include the Ministry of Justice in Kuwait City (1984, designed by Basil Spence), the heritage village in Doha, Novotel hotel in Bahrain, and the mosques of Hassan Fathy in Saudi Arabia.

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