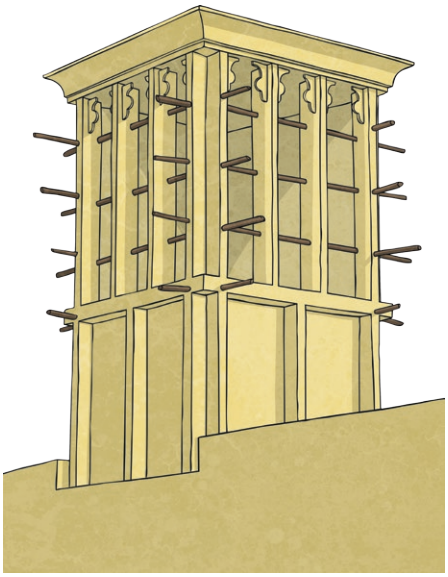
The Arabian Wind Tower (Barajeel)

Today, it is difficult to imagine the Arabian Gulf without air conditioning. For Bedouin of the past, however, the extreme heat of the desert was a constant worry.



In the early 1900s, the barajeel (wind tower) was introduced to the Gulf. The barajeel was a building design that was quickly used as a way of cooling indoor areas. This old air conditioning technique is being used once again as innovators look for less wasteful ways of cooling today's homes.

Passive Cooling

The barajeel lowers the temperature of a home without the use of electrical devices, such as air conditioning units. This is called passive cooling. Passive cooling is a cheaper way of cooling a house. It uses the movement of winds to rid homes of warm air and bring in cool breezes instead.

The Barajeel

The barajeel is a square wind tower. In the past, it was often used by the Bedouin on their Arish huts. Wind towers could keep an Arish up to 20°C cooler than the outdoor temperature. The wind tower is also referred to as a 'wind catcher' because it catches fast moving breezes passing by the top of the tower to cool a home. To understand the barajeel, it's important to know that warm air naturally rises while cool air descends. As warm air enters the tops of the barajeel, it gets cooled inside the tower and then makes its way down inside a home.

Modern Technology and Barajeels

Old Arabian wind towers can be seen in areas like Al Fahidi Historical neighborhood in Dubai, however, these towers are making a comeback. Residents of the Arabian Gulf are the world's largest consumers of energy. Engineers want to copy old barajeel designs to cut wasteful air conditioning habits. An example of this can be seen at Masdar City in Abu Dhabi. The center has created its own 45-metre-tall wind tower. Unlike the barajeel of a home, the wind tower at Masdar is completely outdoors and is designed to bring cooling winds to the people at the ground level of the institute. In the future, more buildings will use this design.

Questions

1. What was a constant worry for the Bedouin of the past?

_____

2. What was introduced to the Gulf in the 1900s?

_____

3. What is happening to this old air conditioning technique?

_____

4. What is passive cooling?

_____

5. Passive cooling techniques use what to work?

_____

6. What is the barajeel?

_____

7. Why is this tower also referred to as a 'wind catcher'?

_____

8. What is important to know in order to fully understand how a barajeel works?

_____

9. Residents of the Arabian Gulf are the world's largest consumers of what?

_____

10. How is the tower at Masdar Institute different from the barajeel of a home?

_____

Answers

1. What was a constant worry for the Bedouin of the past?
   The extreme heat of the desert was a constant worry.

2. What was introduced to the gulf in the 1900s?
   In the early 1900s, the barajeel, or wind tower, was introduced to the Gulf.

3. What is happening to this old air conditioning technique?
   This old technique is becoming new again as innovators look for less wasteful ways of cooling today's homes.

4. What is passive cooling?
   Passive cooling includes ways of cooling a home without the use of electrical devices like air conditioning units.

5. Passive cooling techniques use what to work?
   These techniques use the movement of winds to rid homes of warm air and bring in cool breezes instead.

6. What is the barajeel?
   The barajeel is a square wind tower.

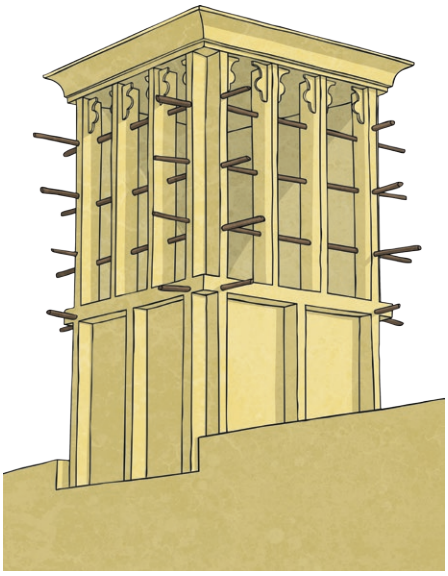
7. Why is this tower also referred to as a 'wind catcher'?
   It catches fast moving winds passing by the top of the tower to cool a home.

8. What is important to know in order to fully understand how a barajeel works?
   It's important to know that warm air naturally rises while cool air descends.

9. Residents of the Arabian Gulf are the world's largest consumers of what?
   Residents are the world's largest consumers of energy.

10. How is the tower at Masdar Institute different from the barajeel of a home?
    The wind tower at Masdar is different because it is completely outdoors.

The Arabian Wind Tower (Barajeel)



Today, air conditioning can be experienced wherever you go in the Arabian Gulf, for example, as you encounter the familiar chill of a mall; as you grab a light jacket and head to the movies; or as you enter a friend's home. For the Bedouin of the past, however, the extreme heat of the desert was a constant worry.

In the early 1900s, the barajeel, or wind tower, was introduced to the Gulf to cool desert homes. The barajeel was an architectural design from Iran. It was swiftly adopted as a means of cooling indoor areas. This air conditioning technique is being used once again as people look for more efficient ways of cooling modern homes.

The barajeel makes up one of several methods of passive cooling. Passive cooling involves lowering a home's temperature without the active use of electrical devices, such as large air conditioning units. Passive cooling techniques provide ventilation (the movement of air) at a low cost. These techniques rid homes of stale warm air and bring in much needed cooler breezes.

The barajeel is a square wind tower which is a common feature of traditional homes in the UAE. Barajeels were often used by the Bedouin and were added to individual dwellings like Arish. They could cool homes by up to 20°C. The wind tower is also referred to as a 'wind catcher' for its ability to catch fast moving breezes. As warm air enters the top of the barajeel, it cools inside the tower. Once cooled, the air eventually lowers, bringing relief for those at the bottom of the tower inside the home.

Arabian wind towers can be seen today in areas like Al Fahidi historical neighborhood (also known as Al Bastakiya) in Dubai. However, wind towers are being used once again. Engineers have noticed that residents of the Arabian Gulf are the world's largest consumers of energy. To tackle this problem, Masdar City in Abu Dhabi has used the barajeel design to create its own 45-metre-tall wind tower. Unlike the barajeels found in homes, the wind tower at Masdar is not attached to a building. It is designed to bring cooling winds to the people at the ground level of the institute. The institute hopes to lead the way in curbing a damaging air conditioning habit.

Questions

1. What was introduced to the gulf in the 1900s and why was it so important?

2. What was the barajeel and why was it swiftly adopted?

3. What is passive cooling?

4. What does passive cooling provide for a home?

5. How did the Bedouin use barajeels? What was their benefit?

6. Why is the wind tower also referred to as a 'wind catcher'?

7. Explain the difference between warm air and cool air and how that plays a role in the barajeel's cooling mechanism.

8. Explain why today's engineers are looking to the old barajeel design? What are they hoping to do?

9. Explain why a place like the Masdar Institute was so interested in using the barajeel design in its very modern landscape?

10. Compare the wind tower at Masdar with the design used by gulf residents of the past. List at least three similarities.

Answers

1. What was introduced to the gulf in the 1900s and why was it so important?
   In the early 1900s the barajeel, or wind tower, was introduced to the gulf and helped cool desert homes

2. What was the barajeel and why was it swiftly adopted?
   The barajeel was an architectural design said to have originated in Iran, and was swiftly adopted as a means of resourcefully providing cooling to indoor areas.

3. What is passive cooling?
   Passive cooling involves lowering a home's temperature without the active use of electrical devices like air conditioning units.

4. What does passive cooling provide for a home?
   Passive cooling techniques provide ventilation, or the movement of air, in indoor areas at a low cost.

5. How did Bedouin use barajeels? What was their benefit?
   Barajeels were added onto individual dwellings like Arish to keep huts up to 20°C cooler (than the outside) during summer months.

6. Why is the wind tower also referred to as a 'wind catcher'?
   It is referred to as a 'wind catcher' for its ability to catch fast moving breezes passing by the top of the tower to provide cooling to lower areas.

7. Explain the difference between warm air and cool air and how that plays a role in the barajeel's cooling mechanism.
   Warm air naturally rises while cool air sinks down. As warm air enters the tops of the barajeel, it cools inside the tower and eventually lowers, bringing relief for those at the bottom of the tower inside the home.

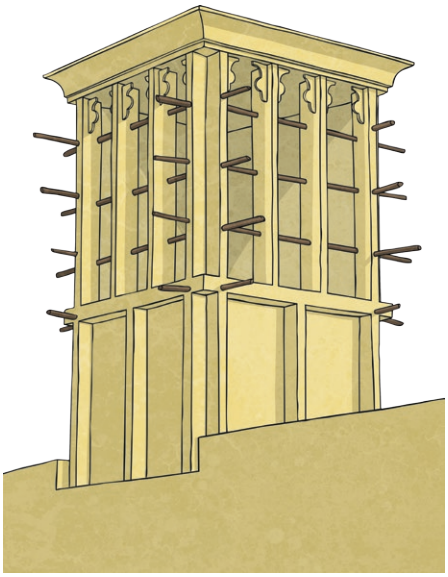
8. Explain why today's engineers are looking to the old barajeel design? What are they hoping to do?
   Engineers are looking to the old barajeel design because residents of the Arabian Gulf are the world's largest consumers of energy. To tackle this problem, Masdar City in Abu Dhabi has used the barajeel design to create its own 45-metre-tall wind tower.

9. Explain why a place like the Masdar Institute was so interested in using the barajeel design into its very modern landscape?

Answers will vary.

10. Compare the wind tower at Masdar with the design used by gulf residents of the past. List at least three similarities.
Answers will vary.

The Arabian Wind Tower (Barajeel)



Keeping cool is critically important in a country like the UAE. As a result, air conditioning has become a significant part of daily life and it can be experienced in the following situations: the familiar chill of a mall; as you grab a light jacket and head to the movies; or as you enter a friend's home. It is difficult to imagine the people of the Arabian Gulf being able to manage without air conditioning. Historically, for the Bedouin of the past, the extreme heat of the desert was an ever-present concern.

In the 1900s, the barajeel was introduced to the Gulf to help desert inhabitants combat extreme heat. Originating in Iran, the barajeel was an architectural design that was eagerly adopted as a means of cooling indoor areas. In recent years, this ancient ventilation technique has grown in popularity once again. As limited energy supplies become more stretched, engineers are actively seeking efficient ways to cool contemporary homes.

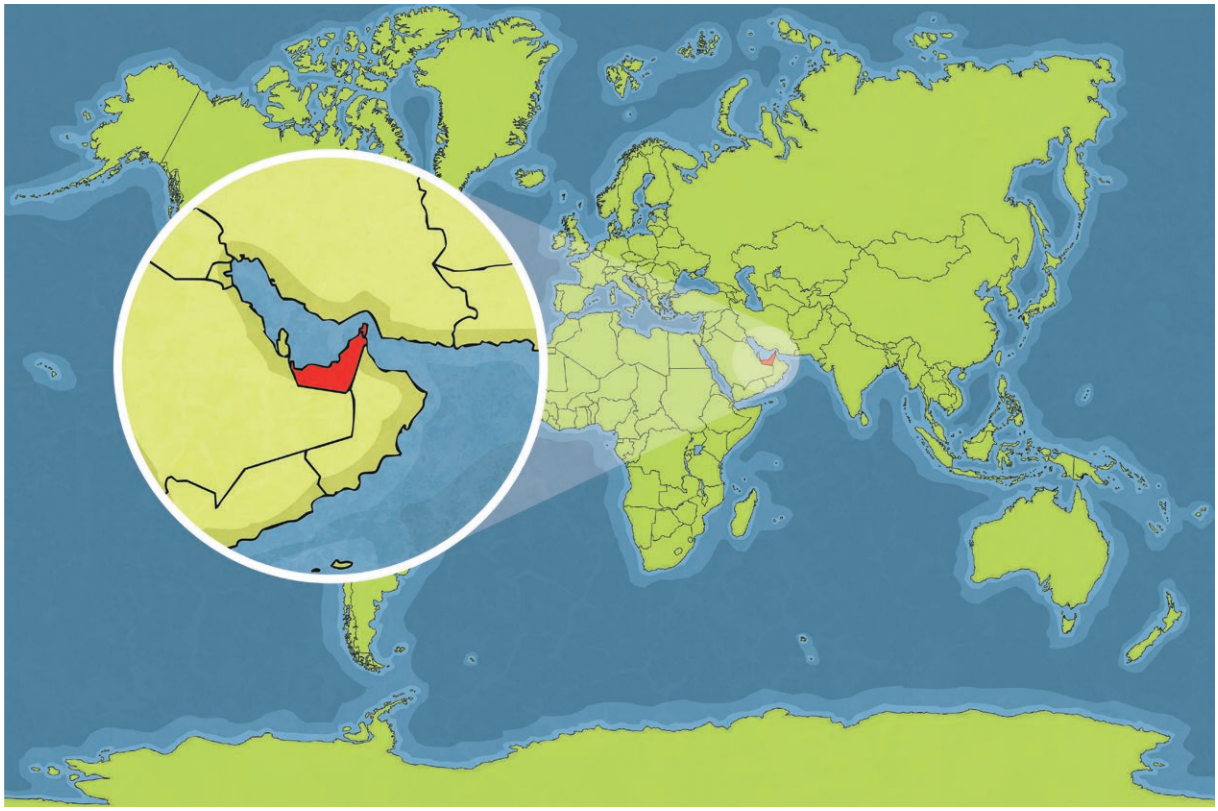
The barajeel is part of an air conditioning method that is known as passive cooling. Passive cooling provides ventilation at a low cost by lowering the temperature of a home without the use of electrical devices, such as large air conditioning units. In passive cooling, stale, warm air is released and cool breezes enter a property.

The design of the barajeel makes it particularly effective at insulating homes. A barajeel is a square wind tower, which was a traditional feature of an Emirati home. In the past, barajeels were traditionally constructed by the Bedouin people when making individual dwellings like Arish to keep their huts significantly cooler during summer months, sometimes by up to 20°C.

The wind tower is also referred to as a 'wind catcher' for its ability to capture fast-moving breezes. To fully understand the mechanics of a barajeel, it is important to understand that warm air naturally rises while cool air descends. As warm air enters through the top of the barajeel, it cools inside the tower and eventually descends, bringing relief for people living inside the building. Due to the extreme weather of the Arabian, the barajeel is an essential part of any home.

Traditional Architecture in the UAE

Arabian wind towers can be seen today in areas like the Al Fahidi Historical neighborhood (Al Bastakiya) in Dubai. However, wind towers are making a comeback as engineers believe this architectural feature can curb unsustainable air conditioning systems in the Arabian Gulf. Energy consumption in the Arabian Gulf is excessive; it has earned residents in the region the dubious honor of being the largest consumers of energy in the world. As a starting point, the zero-carbon institute (Masdar City) in Abu Dhabi has used the barajeel design to create its own 45-metre tall-wind tower. Unlike the barajeel of a home, the wind tower at Masdar is not attached to a building. It is designed to bring cooling winds to the people at the ground level of the institute.



Questions

1. What was introduced to the gulf in the 1900s and why was it so important?

2. What is passive cooling?

3. What does passive cooling provide for a home?

4. How did the Bedouin use barajeels? What was their benefit?

5. How is the tower at the Masdar Institute different from the barajeel of a home?

6. Why is the wind tower also referred to as a 'wind catcher'?

7. Explain the difference between warm air and cool air and how that plays a role in the barajeel's cooling mechanism.

8. Explain why today's engineers are looking to the old barajeel design? What problem are they looking to solve?

9. Explain why a place like the Masdar Institute was so interested in using the barajeel design in its very modern landscape?

10. Compare the wind tower at Masdar with the design used by gulf residents of the past. List at least three similarities.

Answers

1. What was introduced to the gulf in 1900s and why was it so important?
   In the 1900s, the barajeel, or wind tower, was introduced to the Gulf and helped desert inhabitants combat extreme heat. Originating in Iran, the barajeel was an architectural design that was eagerly adopted as a means of resourcefully cooling indoor areas.

2. What is passive cooling?
   Passive cooling involves lowering the temperature of a home without the active energy consumption of electrical devices like air conditioning units.

3. What makes passive cooling techniques efficient and beneficial?
   Passive cooling techniques are beneficial and efficient because they provide ventilation to indoor areas at a low cost. These techniques rely on the knowledge of air movement to rid homes of stale warm air and bring in much needed cool breezes.

4. How did the Bedouin use barajeels? What was their benefit?
   Barajeels were traditionally constructed by the Bedouin people when making individual dwellings like Arish to keep their huts significantly cooler during summer months, sometimes by up to 20°C.

5. How is the tower at the Masdar Institute different from the barajeel of a home?
   The tower at the Masdar Institute is different because it is outdoors and is designed to bring cooling winds to the people at the ground level of the institute.

6. Why is the wind tower also referred to as a 'wind catcher'?
   It is referred to as a wind "catcher" for its ability to catch fast moving breezes passing by the top of the tower to provide cooling to lower areas.

7. Explain the difference between warm air and cool air and how that plays a role in the barajeel's cooling mechanism.
   Warm air naturally rises while cool air sinks down. As warm air enters the tops of the barajeel, it gets cooled inside the tower and eventually lowers, bringing relief for those at the bottom of the tower, inside the home.

8. Explain why today's engineers are looking to the old barajeel design. How urgent is this need?
   Various answers.

9. Explain why a place like the Masdar Institute was so interested in using the barajeel design in its very modern landscape?
   The Masdar Institute was so interested in using the barajeel design to bring cooling winds to the people at the ground level of the institute.

10. Compare the wind tower at Masdar with the design used by gulf residents of the past. List at least three similarities.
    Answers will vary.