
THE ISSUE OF SHADING OPEN SPACE AND PEDESTRIAN AREAS IN COUNTRIES WITH WARM CLIMATES. A PROPOSAL ON THE EXAMPLE OF THE CITY OF KHIVA

Tajibaeva Diyora Muhammadsobir qizi
Tashkent Architecture and Civil Engineering University

Annotation

The article analyzes the approach to creating comfortable conditions for pedestrians and tourists by air control in pedestrian areas in countries with extreme climates of the world. Also, the proposal presents the historical experience of providing moderate climatic conditions in open and closed areas of Uzbekistan and the example of the tourist centers of the city of Khiva in the current urban planning practice.

The main part. Historically, covered walkways were designed to protect residents from adverse weather and create comfort in pedestrian areas, and they were built mostly attached to buildings.

The construction of covered walkways, also known as arcades or galleries, dates back to ancient times. The concept of covered walkways can be traced to various civilizations around the world. There are just a few instances highlighting the historical development of covered walkways:

Ancient Rome: The Romans pioneered the construction of covered walkways, known as Porticoes. Examples include the Porticus Octavia built in the 1st century BCE, which featured a colonnade and covered walkways.

Islamic Architecture: In medieval Islamic architecture, covered walkways called "sahn" or "riwaq" became an essential feature of mosques and palaces. These arcades provided shade and shelter for pedestrians and worshippers. Examples can be found in structures like the Great Mosque of Cordoba in Spain (8th to 10th century) and the Alhambra Palace in Granada, Spain (13th to 15th century).

Renaissance Europe: During the Renaissance period, covered walkways called "loggias" were constructed as part of grand palaces and public spaces. Examples include the Loggia dei Lanzi in Florence, Italy (14th century), and the Loggia della Signoria in Bologna, Italy (16th century).

19th-century Europe: The 19th century witnessed a significant proliferation of covered walkways as shopping arcades in European cities. Examples include the Galleria Vittorio

<https://conferencea.org>

Emanuele II in Milan, Italy (opened in 1877), and The Royal Arcade in Melbourne, Australia (opened in 1870).



Pic.1. Shading methods in historic buildings.

In the 16th century, huge covered shopping arcades – timas – were also built in Bukhara. One of them, the Trade Dome (Tim) of Abdullakhan, named after its builder, a ruler from the Shaybanid dynasty, still exists.

This vast multi-domed structure, square in plan, is located on one of the main market thoroughfares of the city. Its central dome rises above an octagonal base, between the abutments of which pointed arches are thrown. There is a gallery around the main room, covered with many small domes on powerful supports. Arched niches divide the space into 56 trading compartments. All rooms of the passage are interconnected by a system of spacious vaulted enfilades. Soft light pours through the windows cut into the drum of the main dome and the light lanterns in the small domes [1].

The ingenious interior design created a unique microclimate in Tim Abdullakhan. Air circulation, twilight, and life-saving coolness greeted buyers on hot summer days.

Closed courtyards. In winter the courtyard is always warmer than outside, when you are inside a medieval madrasah, and in summer it is cooler. The fact is that all madrasahs in the world have a patio - a courtyard protected on all sides. But not a courtyard-well, as in modern cities, but a spacious, sunlit space.

When designing closed “microclimatic” spaces, it is necessary to take into account the wind rose and the illumination of such spaces by the sun. If everything is calculated correctly, the space will be protected from heat and wind. And additional degrees will be given by the walls, which will accumulate and begin to release solar heat.

<https://conferencea.org>

Modern sun protection techniques in pedestrian areas focus on creating shaded and comfortable environments while allowing people to enjoy outdoor spaces. Here are some prevalent techniques used today:

- **Shade Sails and Canopies:** Deploying shade sails, canopies, or awnings made of durable and UV-blocking materials provides effective sun protection in pedestrian areas. These structures are flexible, and versatile, and can be installed in various configurations to cover specific areas.
- **Vegetation and Green Infrastructure:** Incorporating landscaping elements such as trees, shrubs, and green walls in pedestrian areas helps create natural shade and reduces heat island effects. Dense foliage and appropriately placed vegetation provide effective sun shielding.
- **Smart Materials and Fabric Solutions:** Implementing advanced materials with UV-blocking properties in the construction of canopies, shades, or outdoor structures can offer enhanced sun protection. These materials are designed to minimize heat absorption and provide adequate shade.
- **Designing with Orientation and Layout:** Carefully planning the orientation and layout of pedestrian areas can optimize sun protection. This includes considering the positioning of structures, walkways, and seating areas to maximize shade during peak sun hours.
- **Integrated Solar Panels:** Some modern designs integrate solar panels into shading structures, generating renewable energy while providing sun protection. These structures often feature solar modules on top that provide shade while harnessing solar energy simultaneously.
- **Technology-Enabled Solutions:** Emerging technologies, such as smart sensors or automated shading systems, can be utilized to dynamically adjust shading elements based on real-time sun position, weather conditions, and pedestrian usage.

There should be some kind of buffer zone, convenient and open to everyone. If you trace the experience of Montreal and Singapore, you can see that the entire street for pedestrians is covered (like in medieval Bukhara, by the way) and squares with a completely controlled climate were built there. At every step, there are cafes, shops, benches, and trees in tubs.

In the experience of some countries with a warm climate, the successful results of shading open areas create convenience for the population and allow the flow of tourists to continue even in the summer season. For example:

1. **King Abdullah Financial District (KAFD) - Riyadh, Saudi Arabia:** KAFD features an extensive network of perforated sunshades that cover walkways and outdoor spaces. These geometrically designed shades provide shade while maintaining airflow and allowing natural light to filter through.
2. **The Waterfront Promenade - Singapore:** The Waterfront Promenade along Marina Bay Sands in Singapore incorporates shade structures that combine solar panels and canopies.

<https://conferencea.org>

These structures provide shade, generate solar energy, and house integrated lighting for the promenade.

3. Solar Trees - Dubai, United Arab Emirates: Solar Trees, installed in various public spaces throughout Dubai, combine solar power generation with shaded seating areas. These tree-like structures provide shade while generating renewable energy through solar panels incorporated into their branches.

4. Muelle Uno - Malaga, Spain: The Muelle Uno promenade in Malaga incorporates large retractable umbrellas that provide shade to outdoor seating areas. Controlled with a central system, these umbrellas can be adjusted to accommodate changing weather conditions or desired shade levels.



Pic.2. The Waterfront Promenade - Singapore



Pic.3. Solar Trees - Dubai

These examples demonstrate how modern urban planning focuses on creating comfortable, shaded pedestrian areas that seamlessly integrate sun protection with aesthetics and functionality.

The cities of Uzbekistan are distinguished by the fact that they are very hot in summer. But since the summer season is the period of travel around the world, the uncomfortably hot weather affects the decrease in the tourist potential of cities in this season. Due to the scorching sun, walking around the street or organizing a trip during the day is impossible. In the example of Khiva, a historic touristic city of Uzbekistan with the most severe climatic indicators, recommendations for protection and shading from the negative effects of climate were developed for pedestrians and tourists.

The simplest and most natural way of shading is tall, leafy trees, and water structures are used for cooling in some places. The lack of optimal conditions for the growth and care of tall trees in the climatic conditions of the Khorezm oasis does not allow for the use of the traditional method.

Applying artificial shading equipment creates comfort for walking even on sunny days and gives a unique look to the image of the city. Of course, it is better to install such shading

<https://conferencea.org>

devices mainly in the touristic parts of the city, where people can go for a walk and have fun at any time of the day and season.

References

1. Maksumova M.S. The geo-plastic conception using artificial landscape resources and technologies in hot climate conditions. Tashkent 2016.
2. Xiao-jiang Li, Wei Tu, Yuji Yoshimura, Carlo Ratti A Pedestrian-Level Strategy to Minimize Outdoor Sunlight Exposure. Artificial Intelligence, Machine Learning, and Optimization Tools for Smart Cities (pp.123-134)
3. Nazanin Nasrollahi, Amir Ghosouri, Jamal Khodakarami, Mohammad Taleghani, Heat-Mitigation Strategies to Improve Pedestrian Thermal Comfort in Urban Environments. Energy Transition and Climate Change in Decision-making Processes. November 2020