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Analysis of the presence of natural light in the southern (route) Rasteh of Vakil Bazaar in Shiraz

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Abstract

Light, as the most effective element of nature, beyond providing illumination, light fulfills climatic needs, psychological requirements, and the decoration of spaces. In this regard, the above research attempts to propose a plan based on the past conditions of the Vakil Bazaar in Shiraz and with the help of modeling and software analysis, which will help revive the Vakil Bazaar in Shiraz by examining the current quality conditions of natural light in the southern route(rasteh) of the Bazaar, by improving the lighting conditions. This research was carried out using a descriptive-analytical method with the aid of Rhino software, the Grasshopper and Honeybee plugins to analyze the southern rasteh of Vakil Bazaar in terms of light conditions throughout the year. The findings indicate that the Spatial Daylight Autonomy (SDA) index, based on 300 lux, for the southern route of Vakil Bazaar is currently 23.64. Considering that the SDA index for indoor lighting in suitable conditions is 50, the current lighting conditions are considered unfavorable and should be brought closer to 50 by making changes. based on the calculations of software tests, it is suggested that the roof hornos of the bazaar up to a diameter of one meter.How to improve the lighting conditions in the Vakil bazaar with the help of software analysis and by modeling the past conditions of the Vakil bazaar, is one of the most important results of this research.

Keywords: Natural light;Vakil bazaar, SDA index; Rhinoceros software; Honeybee plugin

1. Introduction

In ancient times, the only source of daylight for humans was the sun (Evans, 2000), while fire was used to provide illumination at night. (Bakrani, 2010). The perception of everything humans have achieved today depends on light. (Ouria, Sayyah & Azami, 2018). Light gives objects identity and shape in our minds. (Majidi & Khodadad, 2018). It not only reveals the true form of objects to us but can also create designs, and patterns, and delineate paths by passing through objects (White, 2009). The spaces in old buildings are adorned with imaginary designs and patterns created by light passing through latticed glass (Najari Nabi & Mahdinajad, 2020). The bazaar, one of the main urban elements, receives numerous visitors daily. Traditional bazaars form the central and integral component of the historical fabric of Iranian cities (Moradi, Bahmani & Oskoui, 2010). These marketplaces are among the few architectural and urban planning relics from past eras that have preserved their original functions and continue to be actively utilized in contemporary society. The location and urban position of the bazaar, its spaces, the important city centers along it, and the role and status of the merchants in urban life caused the bazaar to become more than just an economic space. It evolved into a place for various social activities, including hosting mourning ceremonies and national and religious celebrations. Additionally, the desirable internal covered space allowed it to become a place for recreation and leisure (Irandoost & Bahmani Oramani, 2011). Light in traditional bazaars is generally provided through openings at a height, typically located at the top of the walls and on the roof. These openings are sometimes covered, like wall openings in the shape of rectangles, circles, hexagons, and octagons, and sometimes uncovered, like circular roof hornos (Aminibadar, Mokhtabad Amrai & Majedi, 2020: 5-24). The architectural arrangement of the openings in traditional Iranian bazaars was such that it met the need for light and illumination. It is expected that the amount of daylight received in the interior space of the bazaar should be sufficient for this specific use. Vakil Bazaar in Shiraz is one of Iran's old bazaars that has maintained its vibrancy and plays a special role in urban activities. This research aims to examine and analyze the current conditions of Vakil Bazaar in Shiraz concerning natural light. The following questions are raised in this research:

1.What are the components of utilizing natural light in the architecture of Vakil Bazaar in Shiraz?

2.How can the presence of light in Vakil Bazaar in Shiraz be analyzed using Rhinoceros (Rhino) software and the Grasshopper, Honeybee, and Ladybug plugins, and what are the recommendations for achieving optimal lighting?

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2. Research Background

In alignment with the objectives of the present study, previous research has been categorized into three distinct areas:

1.Investigation of Light Presence in Vakil Bazaar in Shiraz**:** This category encompasses studies that examine the historical and architectural use of natural light within Vakil Bazaar.

2.The Role of Light from Psychological and Spiritual Aspects**:** This area includes research that explores the psychological and spiritual effects of light in architectural spaces, with a particular emphasis on its impact on human well-being and mood.

3.Use of Light Simulating Software in Buildings**:** This category encompasses studies that utilize light simulation software to analyze and optimize lighting conditions in architectural design. These categories may overlap, as certain studies might simultaneously address multiple topics. Table 1 lists the most significant and recent internal research studies pertinent to these areas, providing a comprehensive overview of related findings and advancements. Table 1

Table 1
Research Background

Study Number	Year of Publication	Author(s)	Title	Key Points	Conclusion
(1)	2020	Aminibadar et al.	Analysis of the Presence of Light in the *Rasteh* and *Charsough* of *Qaysarieh* Bazaar of Isfahan	Examination of light inputs from different aspects; software examination based on climatic data	In Rasteh* and Charsough † of Qaysarieh Bazaar, a precise pattern has been used to supply the needed light, providing a model for modern designs based on climate.
(2)	2020	Moazeni et al.	Evaluation of Light Patterns Affecting the Quality of Life of Residents of Residential Units Using Fractal Geometry	Examining light patterns, entrances, and distribution methods in interior spaces	A design model has been presented to improve the presence quality within interior spaces by utilizing natural light.
(3)	2020	Najar et al.	Evaluating the Role of Physical and Functional Factors in the Sociability of Iran's Traditional Bazaars Using Space Syntax Technique: Case Example: Tabriz Bazaar	Investigating traditional bazaars, their history, and the role of bazaars in collective life	A design pattern has been introduced that impacts the sociability of bazaars and enhances collective life.
(4)	2019	Shiri et al.	The Effect of Form on the Amount of Shading and Heat Absorption in the Dome of Yazd Reservoirs	Using the Grasshopper program and its plugins to analyze light conditions	Results are based on different forms with optical entries for the examined sample.
(5)	2018	Majidi et al.	The Effect of Light on the Human Psyche with an Emphasis on the Material of the Interior Surfaces in the Housing Space	Examining psychological effects of light; investigating light's impact on the sense of belonging and desire to be present	Classified results have been provided on the impact of optimal light in indoor spaces on humans.
(6)	2016	Tavakolian Ferdowsieh et al.	Redesigning the Bazaar Based on the Ability to Form the Bazaar and Record the Collective Memory: Case Sample: Khan Bazaar in Yazd	Examining traditional bazaars of Iran; how they are formed; examining elements creating a collective atmosphere and sense of belonging	A model derived from Khan Bazaar has been presented for designing collective spaces inducing belonging, movement, and dynamism.
(7)	2015	Zare et al.	Architectural Design Using Natural Lighting: An Approach in Library Design for Tehran City	Investigating environmental and climatic conditions to determine standards for natural light; introducing natural light and glare control	A plan has been resented for a library design based on natural light for Tehran city.
(8)	2013	Miri et al.	Examining the Requirements of Daylight Access in Iran's National Building Regulations: A Case Study in Qazvin	Checking all requirements and rules; minimum lighting requirements for interiors	All existing criteria for lighting have been summarized and extracted.
(9)	2011	Irandoost et al.	Physical Changes of Traditional Bazaars in Iranian Cities: Case Study: Bazaar of Kerman City	Examining the structure of the traditional bazaars of Iran, how they are formed, Examining the structure of the Kerman city bazaar	A hierarchical model depicting the evolution of creation and transformations over time has been introduced, drawing inspiration from the Kerman bazaar.

The innovation of this research lies in the fact that, for the first time, the researchers have analyzed the impact of natural light in Vakil Bazaar, Shiraz, using the precise and comprehensive Rhino software and its plugins, and examined the bazaar's construction pattern over time based on this element.

3. Theoretical Framework

3.1. The role of light in traditional iranian bazaars

A bazaar is defined as a place for buying and selling and the exchange of goods; in other words, a bazaar is a place for the encounter between seller and buyer, typically located in the city center, consisting of buildings with homogeneous functions. (Tavakolian Ferdowsieh, Ismailpour & Noqsanmohammadi, 2016) The bazaar is a part of the city's core, encompassing multiple pathways that connect and facilitate communication between different parts of the city. (Bahrololoomi, 2017). Essentially, the bazaar acts as a link between the city's central area and other sections. (Sultanzadeh, 2001) The structure of the bazaar is such that the main axis is flanked by interconnected shops. (Shaghafi, 1999) Historically, bazaars typically consisted of two routes of interconnected shops facing each other. (Pirnia & Memarin, 2014) Each bazaar comprised a main trunk and other attached components. (Iqbali Derakhshan, Mandegari & Omidvari, 2014) The main axis was traditionally either straight or branched like a tree. (Rajabi & Safahan, 2009)The buildings and components connected to the trunk included various primary functional uses required by the city at the time, such as mosques, educational buildings, caravanserais, government buildings, and more .(Bahrololoomi, 2017) For the use of natural daylight in interior spaces, there are two distinct areas. The peripheral areas of the building, which are connected to the building’s envelope and have direct access to natural daylight, and the interior areas of the building, for which natural daylight is provided through the use of light transmission systems. (Zare & Heydari, 2015). The components responsible for bringing natural daylight into a building are divided into two groups: guiding components and light-transmitting components. All day-lighting systems consist of a combination of guiding and light-transmitting components. The guiding components are essentially spaces that direct light from the outside into the building. These spaces are divided into two types based on their location and conditions within the building. First, there are spaces between the interior and exterior environments of the building, referred to as intermediate light spaces. Second, there are spaces within the interior parts of the building, referred to as internal light spaces. The light-transmitting components transfer light from one lighting environment to an adjacent one. These elements are divided into three groups based on the direction of light entry into the space. Lateral light-transmitting components introduce light into a space laterally, and by moving away from them, a significant reduction in the intensity of illumination in that space is observed. Zenithal light-transmitting components introduce light into a space from above, facilitating vertical light entry and achieving uniform light distribution throughout the space. The general light-transmitting component provides light entry from the sides and top, thus creating uniform and high-level illumination. These elements require light control components due to excessive radiation entry radiation. (ibid) Daylight openings in Iranian architecture can generally be categorized as follows: they sometimes introduce light directly into a space and sometimes serve as intermediaries through which light enters a space. In the latter case, the light source itself is not visible; rather, the primary objective is to achieve effective illumination within the space. (Meiss, 2005) In this second case, the objective of light entry is not to establish visibility or achieve other goals such as communication but rather to provide desired illumination. (Aminibadar, Mokhtabad Amrai & Majedi, 2020: 5-24). Various types of materials such as colored glass, latticed materials, reflective surfaces (e.g., parapets), light-transmitting solid materials like shutters and lattices, and architectural structural components can be considered light controllers and regulators. (Mahvash, 2014) Bazaars serve as complete examples of architecture that take individuals on sensory journeys through their spatial arrangements and architectural elements. This process involves striking vaults that play with the interplay of bright natural light and winding corridors, engaging the viewer's imagination and creating a sense of anticipation. It draws them to the grand intersections bathed in the radiance of light streaming from the domes' horno. (Najdjavadipour, 2019). The prerequisite for light to enter a closed environment is passing through the entrances created in the walls. These entrances may take the form of openings in the walls, ceilings, or perforated cavities, or they may simply be the building's entrance doors. (Nabil & Mardel Joyk, 2004).

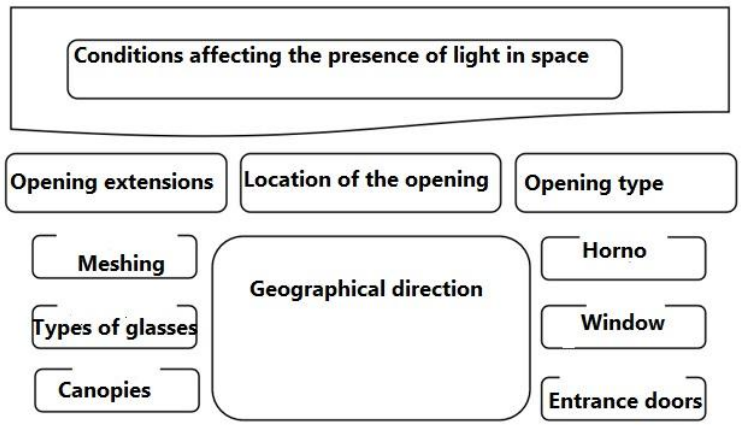

Fig. 1. Conditions affecting the presence of light in space

3.2. Introduction of the scope of the research: Vakil Bazaar, Shiraz

It appears that Shahriar Zand (*Karim Khan Zand*, the founder of the Zand Dynasty) designed the Vakil Bazaar in Shiraz by drawing inspiration from the historic Lar Bazaar, a notable work from the era of Shah Abbas. (Nasr, 2004) Each section within the Vakil Bazaar and its associated collection originally had distinct names corresponding to their usage at that time. (Sami, 1984) Over time, the names of some rastehs, markets, or bazaars in the Vakil collection have evolved among the local population. (Ardeshiri & Memarin, 2010) Vakil Bazaar in Shiraz features two intersecting rastehs —one running north-south and the other east-west, forming a cross-like layout. (ibid) The intersection of these two routes is known as the Charsough, characterized by a large arch. The northern route begins at the Isfahan Gate and extends to the vicinity of *Saraye* Moshir. This northern rasteh, longer than the others, includes the North Vakil Bazaar (also known as Kolahdouzhan or Hat Makers Bazaar) and the New Bazaar. The southern rasteh, known as Bazazan's Bazaar (Drapers' Bazaar), comprises forty-one shops on each side and is currently the darkest rasteh within the bazaar. The eastern rasteh of the market is referred to as Allaqebandan Bazaar, featuring nineteen pairs of cells. The western rasteh, known as Tarkeshduzhan Bazaar, consists of ten pairs of cells. Additionally, a parallel route to the western section, located in the southern rasteh, is called Shamshirgaran Bazaar, which contains eleven pairs of cells. (Bahrololoomi, 2017). Table 2 and Figure 2

Table 2
The Process of Construction and Development of Shiraz Bazaar

Historical Period Based on Sovereignty	Market Scope	Development Process
Aleboyeh and Safari	Istakhar Gate to Jame Atiq Mosque	Formation of a line towards the gate of Istakhar
Safavi	Kazeroon Gate to Isfahan Gate	Development towards the north
Zandieh	Kazeroon Gate to Isfahan Gate (centered on Vakil Bazaar)	Development towards the north
Qajar	Kazeroon Gate to Isfahan Gate (centered on the buildings of the Zandiye period)	Continued northern development
Pahlavi	Kazeroon Gate to Isfahan Gate and the intersection of Karim Khan St	Street construction and decline in market importance

(Source: Nasr, 2004)

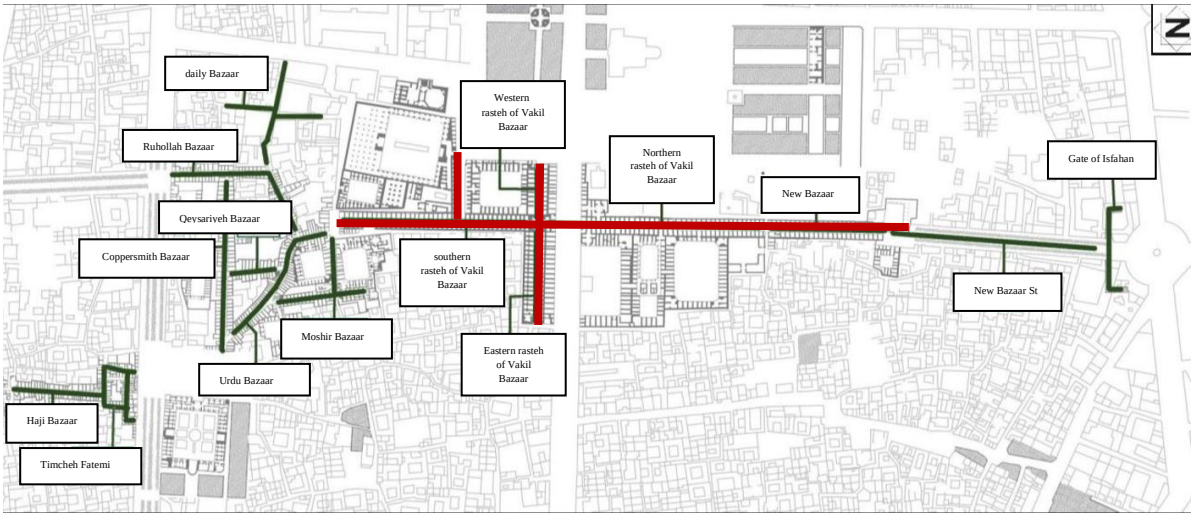

Fig. 2. The Existing Layout of rastehs in Vakil Bazaar, Shiraz
(Source: Bahrololoomi, 2017)

The Vakil Bazaar, in terms of architectural structure, features pathways and walkways for customer passage. The shops are predominantly structured with a *pastoo* (a rear section of the shop) and are typically arranged over two floors. The shop's precinct is a space with a width of less than one meter and approximately two steps higher than the bazaar's floor level, and the chamber space, which is the selling area. To protect goods from moisture, the chambers are built about 70 centimeters above the ground level. This bazaar has five large gates located at its four corners. The square-shaped chambers on two floors are located in the Charsough vestibule. In the past, there used to be a large marble basin in the middle of the Charsough, the water of which was supplied from a path passing under the western aisle of the bazaar. Due to the rise of the market floor in different eras, the marble basin has disappeared. Thanks to the relatively high ceilings of the vaults and the presence of openings called "Horno" with a diameter of one meter, sufficient air and light have been provided for the bazaar. Currently, after renovations, most of these openings have been closed. However, there are still lattice openings at the top of all chambers for illumination and ventilation purposes .(Bahrololoomi, 2017).

Fig. 3. General schematic of Vakil Bazaar, Shiraz
(Source: Organization of Cultural Heritage, Tourism and Handicrafts of Fars Province)

Fig. 4. Current images of Vakil Bazaar, Shiraz.

In general, it can be said that light enters Vakil Bazaar, Shiraz, in two forms: direct and indirect. Direct light enters from the top of the bazaar doors and ceiling light wells, while indirect light enters through filtered light collectors inside the walls. The lighting intensity in public spaces can vary depending on the use and conditions. For example, for spaces that include corridors, the lighting intensity should be at least 100-150 lux to provide comfort for users. Since the lighting intensity required for a classroom, where the need for lighting is very important, is 300 lux, the amount of lux required for the market can be considered as 150 to 300 lux depending on the conditions.

4. Research Methodology

This research uses a descriptive-analytical approach, employing software analysis with Rhino and the Grasshopper, Honeybee, and Ladybug plugins to assess the lighting conditions in the southern *route* (rasteh) of Vakil Bazaar throughout the year based on the Spatial Daylight Autonomy (SDA) index. Initially, the natural lighting conditions of Vakil Bazaar at the time of its construction were categorized and analyzed based on library and field studies. Subsequently, the current interior lighting conditions of the bazaar were simulated annually using the mentioned software, based on the climatic data of Shiraz and the SDA index in the southern rasteh of Vakil Bazaar. The proposed improvements for enhancing the lighting conditions were then tested through modeling. The innovation of this research lies in the precise and comprehensive analysis of the impact of natural light presence in Vakil Bazaar, Shiraz, using Rhino software and its plugins, and in analyzing the bazaar's construction pattern over time based on this element.

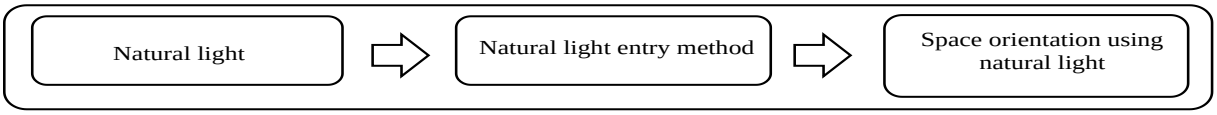

Fig. 5. Utilization of light in the architectural design process

5. Results and Discussion

5.1.Natural light evaluation indices

Appropriate lighting for an environment is one that not only provides visibility but also enhances readability and image quality(Moazeni, Tuofan & Sattarzadeh, 2020), promoting vitality, happiness, and a sense of movement in the space. (Melman, 2005) The examination of daylight in this study encompasses a range of weather conditions throughout the year in the Shiraz climate, including cloudy, partly cloudy, and sunny skies. The indices for evaluating natural light are as follows:

-Daylight Illuminance Level: Momentary measurement to determine the extent of access to light in indoor spaces, measured in lux units. (Miri & Company Saeed, 2012).

- Daylight Autonomy: It is a dynamic evaluation index. For a specific point, it equals the percentage of time during which the building is in use during the day and the desired light is provided through natural light. The amount of this desired light is determined based on the specific use of the space. (ibid)

- Spatial Daylight Autonomy: The percentage of the indoor workspace area that has sufficient access to natural light for illumination. What the Illuminating Engineering Society recommends is that at each point of the workspace area, a minimum daylight autonomy of fifty percent along with a minimum required natural illumination of three hundred lux between 8 a.m. to 6 p.m. The index for this is SD50/300. (Aminibadar, Mokhtabad Amrai & Majedi, 2020: 5-24).

- Useful Daylight Illuminance: The illumination present in a building for how much of its total occupancy time is useful. In this definition, less than 100 lux is considered very dim, between 100 and 2000 lux is deemed useful,

and above 2000 lux is considered very bright. (Nabil & Mardel Joyk, 2004).
- Useful Daylight Illuminance per Space: Similar to the Useful Daylight Autonomy (UDA), instead of using the autonomy of daylight, it employs useful daylight illuminance. The index for this metric is %50 /2000-100 lux-hours . (Aminibadar, Mokhtabad Amrai & Majedi, 2020: 5-24).
- Adequate Natural Illumination: If a range of illumination is considered sufficient for an indoor space, the conditions can be categorized into two groups: adequate illumination and inadequate illumination. Now, if it is necessary to evaluate a point in space based on sufficient or insufficient illumination, one of the dynamic assessment methods should be used for all weather conditions throughout the year for that point. (Miri & Company Saeed, 2012). The Illuminating Engineering Society of North America (IESNA) has specified that for spaces such as classrooms or offices, a minimum of fifty percent autonomy with three hundred lux illumination should be considered for assessing whether the illumination is sufficient or not. (Reinhart, 2014). Considering the previously mentioned conditions, if a point meets seventy-five percent of either the Useful Daylight Autonomy (UDA) or the Useful Daylight Illuminance (UDI) index, the space is considered to have desirable illumination. However, if this percentage decreases to fifty-five percent, the space is labeled as having acceptable natural illumination.(Irandoost & Bahmani Oramani, 2011).

5.2. Software simulation of light behavior model in Vakil market of Shiraz

Simulating the current conditions of the southern aisle of Vakil Bazaar, Shiraz, in this section is based on the amount of light received in indoor spaces. Generally, the amount of incoming light from various entrances varies depending on different weather conditions.(Shiri, Didehban & Taban, 2019) The variable angle of sunlight in different seasons can result in different degrees of light reception in indoor spaces. Additionally, the type of sky also has a significant impact, whether it's cloudy, partly cloudy, or sunny, each creating different conditions. (Safaeetabar, 2016) Now, two methods are available for simulation with software:
Method 1: The first method involves a static investigation in which natural light is simulated for the ceiling and wall light entrances of Vakil Bazaar. The simulation is conducted on two specific days: December 21, when the sun is at its lowest altitude, and June 21, when the sun is at its highest altitude. Observations are made at three specific times of the day: 9:00 AM, 12:00 PM, and 3:00 PM. (Reinhart, 2006).
Method 2: The second method employs a dynamic review, wherein a one-year time frame is defined for the software, and the overall average of existing conditions is used as the measurement criterion. Compared to the static method, the dynamic review is more comprehensive and credible, as it provides an unbiased measurement of general conditions over an extended period, ensuring an accurate representation of the bazaar's average conditions. In this method, the Ladybug and Honeybee plugins are utilized to integrate the climatic data for the city of Shiraz into Rhino software over an annual period. The settings are configured to reflect the general bazaar conditions for one year, encompassing all weather variations and sky types. This approach allows the software to compile the necessary general data, providing a thorough and detailed assessment of the lighting conditions within Vakil Bazaar throughout the year.

5.3. Simulation of natural light entry for existing conditions in Vakil Bazaar, Shiraz

Natural light simulation for the ceiling and wall light entrances on the south side of Vakil Bazaar is conducted using Grasshopper over an annual time frame. To effectively visualize and analyze the current conditions, a color spectrum is applied in both horizontal and vertical sectional images.
A vertical section along the central axis of the bazaar rasteh and a horizontal section at a height of seventy centimeters from the floor—corresponding to the product supply platforms—are utilized to depict the simulation results.
A. Simulation of annual daylight for the southern rasteh
The lighting conditions of the southern rasteh, which includes eighty-two windows and the main entrance, have been simulated to assess daylight availability over a year. Based on the Spatial Daylight Autonomy (SDA) index, the analysis provides the following results:

- For a threshold of 300 lux, the SDA value is 23.64.
- For a threshold of 150 lux, the SDA value is 67.23.

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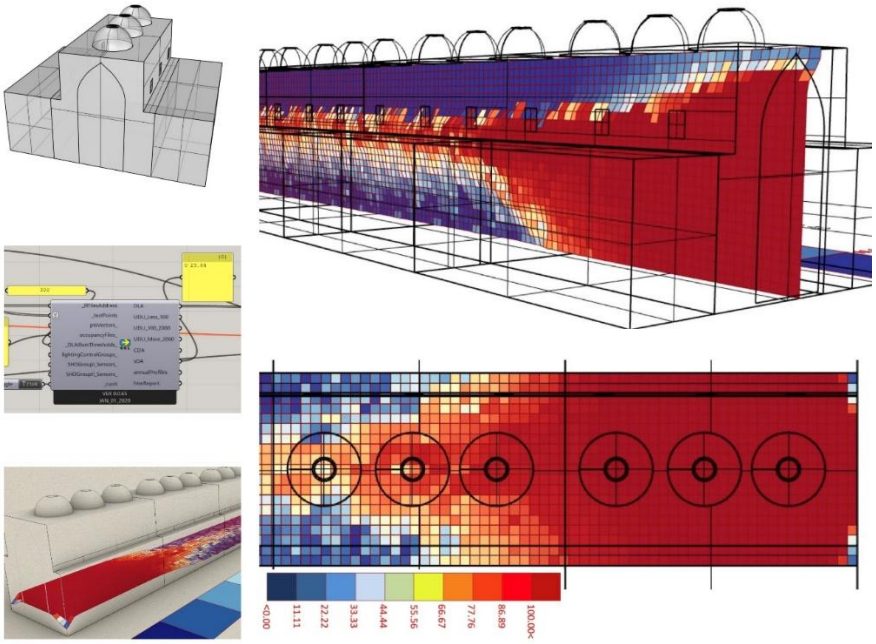


Fig. 6. Software analysis of current Lighting conditions in the southern rasteh of Vakil bazaar

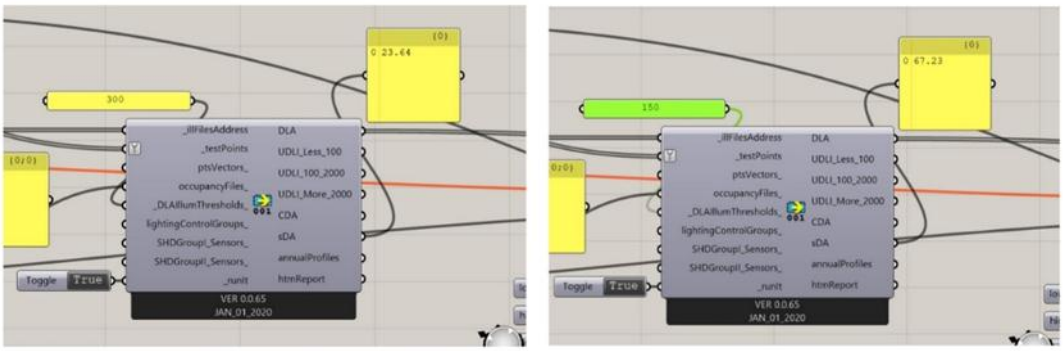


Fig. 7. Spatial daylight autonomy (SDA) obtained through software analysis for existing conditions in Vakil bazaar

In the analysis of daylight availability throughout the entire southern rasteh, as shown in the figures, areas near the main entrance door do not face significant issues in terms of daylight provision. This well-lit zone extends approximately thirty meters from the entrance. However, moving from the entrance toward the Charsough, the influence of the entrance light diminishes, and the windows become the sole source of natural light. Assuming that the section of the bazaar near the Charsough might be illuminated by light from other entrances and hornos, the darkest area within the southern rasteh is identified as the cells located forty-four meters from the middle. These cells experience the least natural light penetration in the southern rasteh.

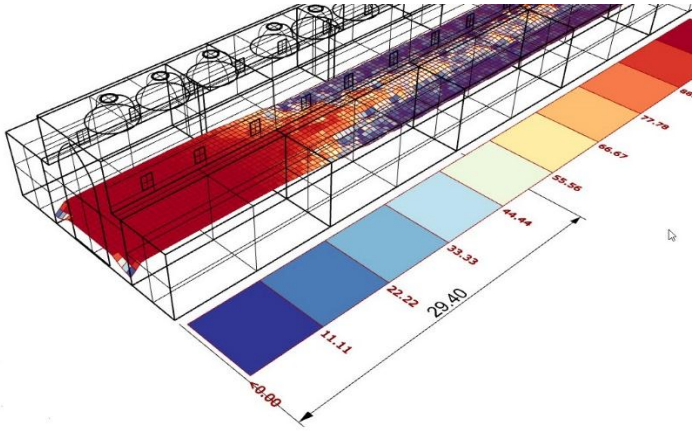


Fig. 8. Current Light Levels from the South Entrance of Vakil Bazaar

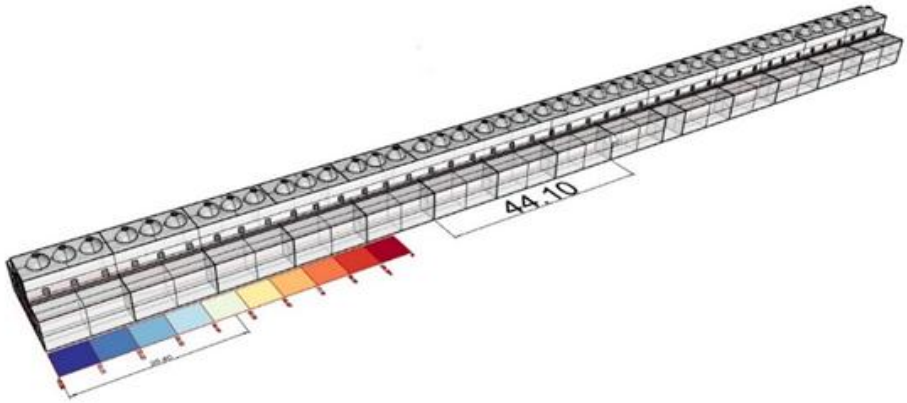


Fig. 9. The Darkest Area of the Southern Rasteh Under Current Conditions

B. Simulation of optical behavior under test

The southern rasteh is characterized by a singular overall shape consisting of repeating similar blocks. (Nasr, 2004) For this test, the southern rasteh has been hypothetically divided into three sections, each corresponding to a horno. Analysis results indicate that currently, only approximately two units of space near the southern entrance meet acceptable conditions based on the SDA index. Considering the price and historical significance of Vakil bazaar in Shiraz, structural interventions are not feasible. Therefore, a viable solution appears to be selectively opening the existing hornos to allow more natural light.Historically, the diameter of the daylighting holes in the hornos was one meter. (ibid) To minimize structural interference, the initial approach involves partially opening only the central horno of each unit, allowing for 50% of its available capacity in the simulation. With a consideration of 300 lux, the obtained SDA value is 27.32.

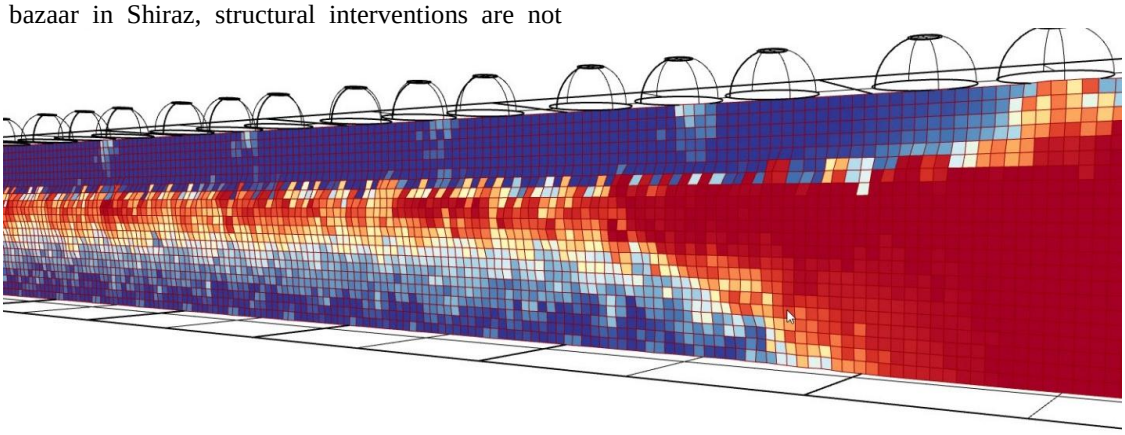
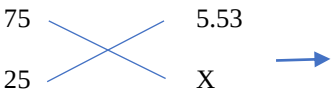


Fig. 10. Exposure of the Southern Rasteh in the Initial Stage

In the second stage, only the central horno of each unit was opened, with an aperture equivalent to seventy-five percent of the available capacity in the simulation. With a consideration of 300 lux, the SDA value is 29.17. Additionally, with a consideration of 150 lux, the SDA value is 76.25. To achieve acceptable conditions, the SDA index in the southern rasteh must reach approximately 31.36, according to the fifty-five percent index. Initially at 23.64, achieving this target requires an increase of about 7.72 units. Testing indicates that creating a hole with a diameter of twenty-five centimeters in each horno increases the SDA index by approximately 1.84. Therefore, if holes with a diameter of one meter are opened in all hornos, the SDA index in this scenario would reach 45.72

29.17- 23.64=5.53



X=1.84

25*4=100, 1.84*4=7.36, 3*7.36=22.08 ,
22.08+23.64=45.72

6. Conclusion

This research investigates the lighting conditions throughout the year in the southern rasteh of Vakil Bazaar using Rhino and Grasshopper software alongside Honeybee and Ladybug plugins. The findings reveal a current SDA index of 23.64 for the southern part of Vakil Bazaar, considering 300 lux. With the ideal SDA index for internal lighting being 50, the existing conditions are deemed inadequate.By examining historical data and conducting simulations, it's observed that hornos in the Vakil Bazaar historically had one-meter diameter holes. Hence, it is suggested to open the hornos with similar dimensions. Simulating these conditions results in an SDA index of 45.72, considering 300 lux.The primary goal of this research is to maximize natural light utilization while minimizing changes to the market space. Although the achieved SDA index of 45.72 falls slightly short of the ideal 50, considering the market's usage, this difference may be negligible. What has been mentioned is the lessons learned from the quantitative and qualitative analysis of the presence of natural light in the southern rasteh of Vakil Bazaar in Shiraz as one of the examples of traditional markets in Iran. Although the specific use of the bazaar imposes limitations for creating apertures for daylighting, the results of this study show that the ideation and the design of the light entrances in this structure have the potential for contemporization and can be used as a model, and can inspire designers and architects in the design of commercial and public spaces. Further research in this area can be focused on the dimensional ratios of the spaces and the light entrances, towards better diffusion and permeability of light.

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