

Street Light Design Plan for Hong Village Tourist Attractions Using Traditional Cultural Elements of Huangshan Mountain

Wanfen Zhu¹, Sangyun Han²

¹Doctoral Student, Department of Convergence Industry Design, General Graduate School of Hanseo University, Seosan, Republic of Korea (2020090013@stu.ahbvc.edu.cn), First Author

²Professor, Department of Convergence Industry Design, General Graduate School of Hanseo University, Seosan, Republic of Korea (han1469@hanseo.ac.kr), Corresponding Author

ARTICLE INFO

Article history:

Received 23 November 2023

Revised 16 December 2023

Accepted 19 December 2023

Keywords:

Chinese Huangshan, Design, Hong Village Scenic Area, Public Road Lighting, Traditional Cultural Elements

ABSTRACT

Currently, public streetlight designs in cities are often simplistic and fail to reflect the unique characteristics of the urban environment. With Huangshan traditional cultural elements as the main elements of the design, combined with public street lights, this paper proposes a rational design scheme. For the purpose of research, it adopts the following research scheme and selects Hong village Scenic Area in Huangshan City, Anhui Province, China as the object of investigation. It investigates the concept and type of public street lamp design, grasps the existing problems, puts forward a reasonable basis and method. Firstly, it studies the design of public street lights that reflect the characteristics of Hong village to inherit the traditional culture of Huangshan. Secondly, based on the current situation of street lamps, it collects patterns, colors and modeling elements of traditional cultural elements of Huangshan, proposes suitable design schemes through the investigation, the existing public street lamp design can not reflect the characteristics and cultural values of Huangshan. From the design cases, it puts forward the specific scheme suitable for the design of public street lamps.

1. Introduction

1.1 Research background and objectives

Traditional designs of public streetlights often fail to meet the demands of contemporary society, raising the crucial question of how to incorporate local cultural characteristics into public facilities. Public streetlight design is an integral part of urban infrastructure, influencing the overall development of cities, including famous landmarks and street planning. The modern pursuit extends beyond simple illumination functionality, emphasizing aesthetic, creative, practical, and cultural aspects of streetlight design.

Therefore, this study conducts a systematic theoretical exploration of public streetlight design,

aiming to provide experiences and new ideas for the theoretical research and design of public streetlights in the Hong village Scenic Area in Anhui Province, China. Focused on the Hong village tourist attraction, the research examines various types of public streetlights, identifying existing issues in their design. By delving into local lifestyle, ideology, habits, cultural landscapes, and other factors, the study translates and incorporates these elements into the design of public streetlights. Through the integration of theory and practice, the goal is to create a more diverse range of public streetlight designs for public spaces.

1.2 Research scope and methods

Figure 1 depicts a map of the Hong village Scenic Area in Huangshan City, Anhui Province, China.

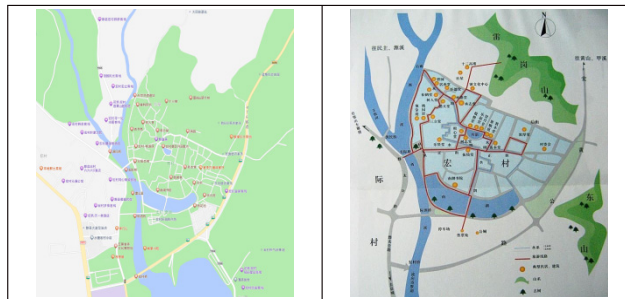


Fig. 1. Geographic location of Hong village Scenic Area in Huangshan City, Anhui Province, China

Located at the southernmost tip of Anhui Province, China, Huangshan City boasts rich tourism resources, attracting numerous visitors, including popular destinations like Huangshan Scenic Area, Hong village, Xidi, and Chengkan, as shown in Figure 2 the tourist attractions of Huangshan City, China.

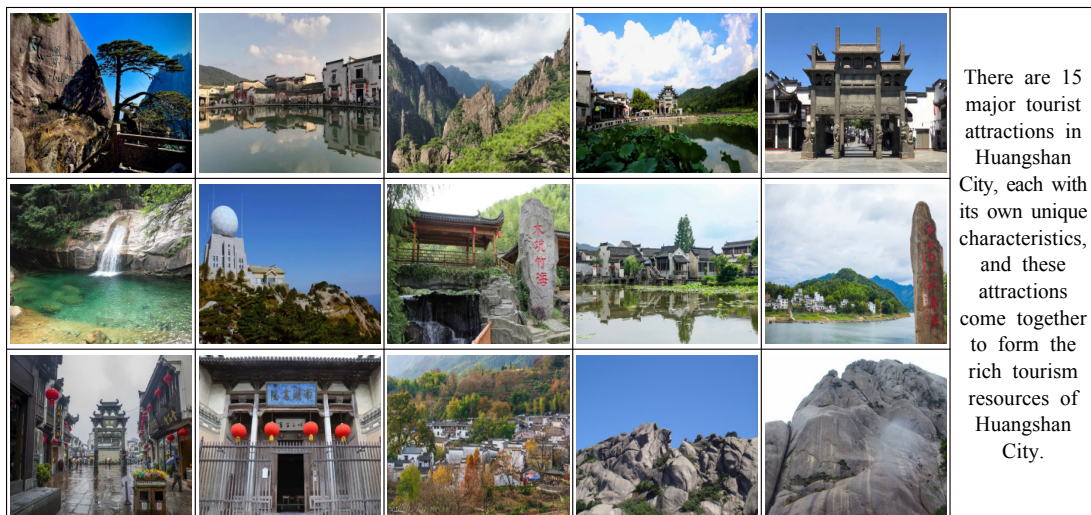


Fig. 2. Huangshan Tourist Attractions, China

Hong village, situated in the northeast of Yixian County, Huangshan City, Anhui Province, China, covers an area of 188 square kilometers. In 2000, it was inscribed on the UNESCO World Cultural Heritage list and designated as a national key cultural relic protection unit (Yuan Xin, 2023). As one of Huangshan City's renowned historical and cultural landmarks, Hong village has preserved over 140 well-preserved ancient residences from famous historical periods. In addition to its unique architecture, Hong village boasts distinctive folk customs, including traditional festivals, marriage customs, culinary culture, and traditional crafts. Each traditional festival features unique activities and practices. These cultural traditions enhance the charm of Hong village, offering insights into its history and culture. Figure 3 outlines various distinctive celebrations in Hong village.



Fig. 3. Various special festivals in Hong village

Research Methods:

- (1) Literature Review: To analyze the problems in the public street lamp design of Hong village Scenic Area in Huangshan City, Anhui Province, China and propose reasonable design suggestions, relevant papers, works, and online materials were studied. The existing deficiencies in current designs were identified based on the study of the theory of public street lamp design and the integration of Huangshan traditional cultural elements into lamps, forming the basis for this systematic research.
- (2) Survey Research: As the author's hometown, the author conducted multiple on-site investigations from March 2022 to March 2023 in Huangshan City, collecting and organizing relevant materials. Combining literature analysis, the study involved an inspection of the public street lamps in Hong village Scenic Area in Huangshan City, Anhui Province, China to understand the main existing issues.
- (3) Case Study of Excellent Examples: To effectively integrate Huangshan traditional cultural elements into the public street lamp design of Hong village Scenic Area, methods were summarized to provide references for the design. This involved reviewing and summarizing excellent design cases.
- (4) Design Practice: To demonstrate the interaction between Huangshan traditional cultural elements and the public street lamp design in Hong village Scenic Area and contribute to the development of the cultural image of tourism, design proposals were developed. The conclusions of this research were drawn based on content development and design.

2. Research Status Analysis

2.1 Concept and classification of public street lights

Public street lights are one of the types of public facilities, which are outdoor facilities that provide lighting functions, both practical and decorative, and are widely used in various places that need lighting to ensure people’s travel safety at night. Public street lamp types can be classified according to factors of their application field, function, design and shape. It is roughly divided into functional street lights based on function and ideographic street lights based on demand (Fan, 2017). The former is mainly based on lighting, while the latter takes into account both functionality and aesthetics through different forms, changeable colors, appropriate materials and meaningful decoration, it clearly reflects the image characteristics of the region, arouses people’s emotional resonance, and integrates with the city. It can be seen that the design of ideographic public street lights can better reflect traditional culture and characteristics.

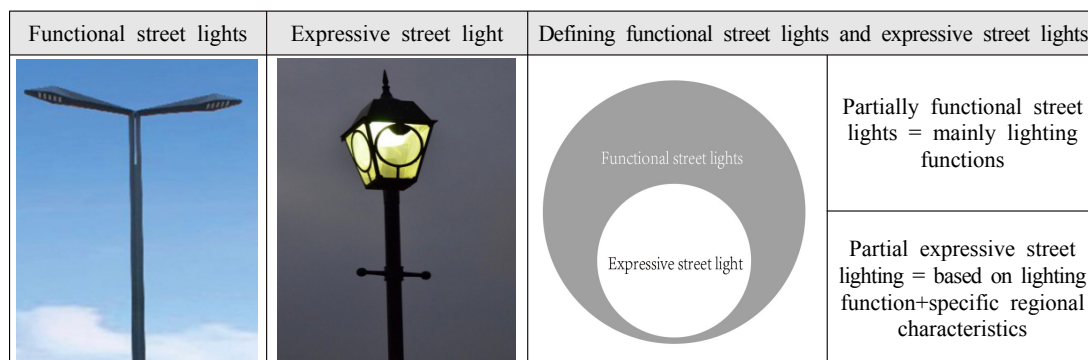


Fig. 4. The relationship between functional street lights and expressive street lights

The main research object of this study is the design of street lamp in Hongcun scenic area of Huangshan City, mainly the ideographic street lamp. It puts the types of public street lights into the following table, which can be divided into street lights, landscape lights, wall lights, and lawn lights according to the types of ideographic street lights.

Table 1. Street light design survey content

Type of street light	The role of street lights
1 road lights	It is mainly used to provide road lighting for the safety of pedestrians and vehicles.
2 landscape lamp	It is used to highlight the natural landscape, gardens, and buildings within the scenic area to enhance the beauty of the scenic area.
3 wall lamp	Installed on the exterior of a building, it is used to provide lighting and decoration around the building.
4 lawn lamp	Used to decorate scenic spots, public places, or festive events to enhance visual appeal.

2.2 Preliminary practice of public street lighting design

In terms of form, it can be roughly divided into two styles, the classical style represented by France and the modernist style represented by Northern Europe. The street lamp design of European countries has the characteristics of classical style, similar to the architectural style of the surrounding. In the streets of France, there are many classical style buildings represented by Baroque and Rococo in exquisite artistic carvings. Among them, Rococo decorative elements are more than natural environment, and Baroque style pays more attention to integrity (Xun, 2023). It can be seen that the design form of urban street lamps is unified with the architectural style accumulated in history, and the construction of urban image is the premise.

Nordic design is influenced by modern aesthetics and follows the concept of “less is more”, which advocates the people-oriented design concept, the pursuit of minimalist design form (Chu, 2017). The unified style of the modern city consists of geometric form and straight line as the main components, and uses lines, colors and textures to convey the aesthetic sense of form.

Japanese street lamp design and northern European design have similarities, both use the surrounding environment to shape the form of street lamps. In Japan, “simplicity” is regarded as an attitude towards life which is also used by designers as a starting point for solving practical problems (Luo, 2022). Designers pursue simplicity, pay attention to connotation, use structural design to serve function, design form has geometric, three-dimensional characteristics.

Survey subjects	Current status of street light design		
French street light design			
Nordic street light design			
Japanese street light design			

Fig. 5. Display of street lights in various countries

2.3 Analysis of the current status of public street lighting design

One of the most iconic decorative street lamps in China is the Tiananmen lantern in Beijing. This particular street lamp was constructed and put into use in 1959. For decorative purposes, the lantern design serves two main objectives: one approach involves the use of traditional light bulb shapes, arranging multiple lamps and connecting them to the lamp arms to enhance the overall shape of the lamp arm. The second approach utilizes specific light bulb designs, often in the form of flowers, arranged in a regular pattern. In both cases, a large number of light sources are used to simultaneously fulfill the requirements of both lighting and decoration. However, after conducting on-site research, it can be observed that the water drop magnolia lantern design is popular in cities such as Shanghai and Chengdu in China. Despite its widespread use, this design does not effectively contribute to the promotion of urban culture.

The design of the flying street lamp in Dunhuang, China reflects the distinctive characteristics of the region. The light pole is creatively shaped to resemble a flying figure, with the streamer connected to the sky and the limbs and arms serving as lamp arms. This design successfully achieves a harmonious integration of both functionality and form. “The colors of flying figures are mainly white, red, cyan and gold, and flying street lights also use these colors.” (Wang, 2023). However, from a design perspective, it can be observed that the image of a flying figure was directly incorporated without much refinement or processing. As a result, the true beauty of the design is not fully reflected.

Through research and analysis, it becomes evident that the majority of street lights prioritize functionality over aesthetics. This lack of regional variation has resulted in a uniformity in the design of decorative street lighting. The pursuit of visual appeal and brightness often occurs without much consideration, leading to the irrational use of light sources and resulting in significant wastage.

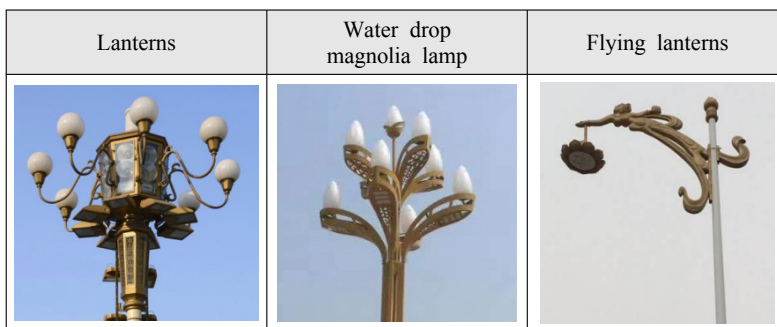


Fig. 6. Street light case presentation

3. Design Survey Content

To gain a comprehensive understanding of the current state of public street lighting design, the author conducted multiple visits to the tourist attractions in Huangshan City, from March 2022 to March 2023. The author made meticulous notes and records of various street lighting designs found within the distinctive tourist areas. The primary focus of this research was conducting a detailed analysis of the street lighting design in the Hong village Scenic Area of Huangshan City.

3.1 Survey on public street lighting design in Huangshan City

The author conducted an investigation on the street lighting designs specifically in the tourist attractions of Huangshan City. The study primarily focused on street lights, landscape lights, wall lights, and lawn lights within the Hong village Scenic Area. Through analysis, the author identified various design issues associated with these typical examples of public street lighting.



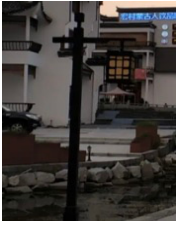









Classification of public street lights		Street light type			Current status issues
1	Road lights				1. The application of traditional cultural elements in Huangshan is not obvious.
					2. The shape is a bit old.
					3. Lack of uniformity.
2	Landscape lamp				1. Single shape.
					2. The form cannot be coordinated with the environment.
					3. The exterior pattern does not match the traditional culture of Huangshan Mountain.
3	Wall lamp				1. Inconsistency between morphology and environment.
					2. Unbalanced distribution.
					3. There are no elements reflecting Huangshan culture.
4	Lawn lamp				1. The shape does not match the surrounding environment.
					2. Most of them are square and cylindrical, with no features.
					3. Cultural factors have not been fully utilized.

Fig. 7. Issues related to street lighting surveys

Based on the field survey conducted, it was observed that the traditional cultural elements were not prominently incorporated in the design of street lights. Moreover, there was a lack of clear distinction between landscape lights and street lights, which did not effectively serve the purpose of enhancing the overall landscape. Additionally, several issues were identified with the existing landscape lamps, including aging and underutilization. The wall lights were either scarce or severely damaged, lacking compatibility with the surroundings, and posing safety concerns regarding nighttime lighting. The presence of lawn lights

was minimal, resulting in a low nocturnal ambiance. In certain areas of the scenic spot, public street lights were absent, leading to dimly lit regions during night viewing, which necessitates immediate attention.

To effectively address streetlight design for tourist attractions, careful consideration must be given to showcasing these attractions at night while preserving their natural beauty. Research efforts should concentrate on utilizing soft lighting techniques that effectively illuminate mountains, trees, and streams within the scenic area, thereby enhancing visitors’ nighttime experiences. It is essential to select sustainable materials and technologies to reduce dependence on natural resources and minimize waste and energy consumption. The existing state of public street lighting design should be aligned with local planning initiatives and sustainable development goals, ensuring that the street lighting design harmonizes with the landscape of Hong village and serves the needs of both the city and its visitors.

3.2 Public street light design questionnaire

Active listening to visitors’ feedback is crucial for enhancing the quality of the city. In Huangshan City, there is a strong emphasis on public participation in the design of public street lighting. The author conducted a targeted questionnaire survey to gather opinions and intentions from both residents and tourists visiting the vicinity of Huangshan City. Although the questionnaire collected was comprehensive, the final valid sample was analyzed using statistical analysis methods through the SPSS program.

A total of 209 questionnaires were distributed, out of which 200 valid questionnaires were collected. The collation and analysis of these 200 questionnaires revealed that the respondents were slightly skewed towards women, with a 50% to 50% ratio of men to women. Among the participants, individuals in their 20s accounted for 45%, those in their 30s accounted for 33%, those in their 40s accounted for 16%, and those above 50 accounted for 6%. Individuals under 18 and over 60 constituted only a minority. The respondents’ occupational groups were categorized into employees, students, and other members of the community.

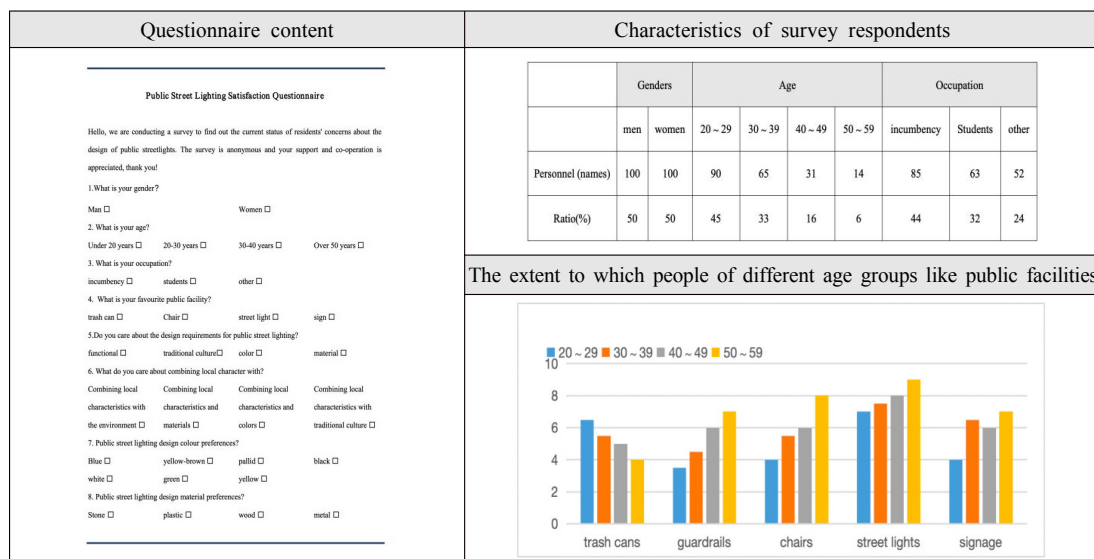


Fig. 8. Questionnaire survey related content

The statistical analysis of the questionnaire survey reveals that 70% of individuals between the ages of 20 and 29 expressed a liking for street lights, while 75% of those aged 30 to 39 and 80% of middle-aged individuals aged 40 to 49 shared this sentiment. Among middle-aged individuals aged 50 and above, 90% expressed a liking for street lights. These findings demonstrate that people of all age groups value street light design, indicating a high level of public appreciation. The residents of Huangshan have shown their approval for improving street lights, actively putting forth their own ideas and requirements for street lighting design. They are also eagerly anticipating innovative street lighting design in the Hong village Scenic Area of Huangshan City.

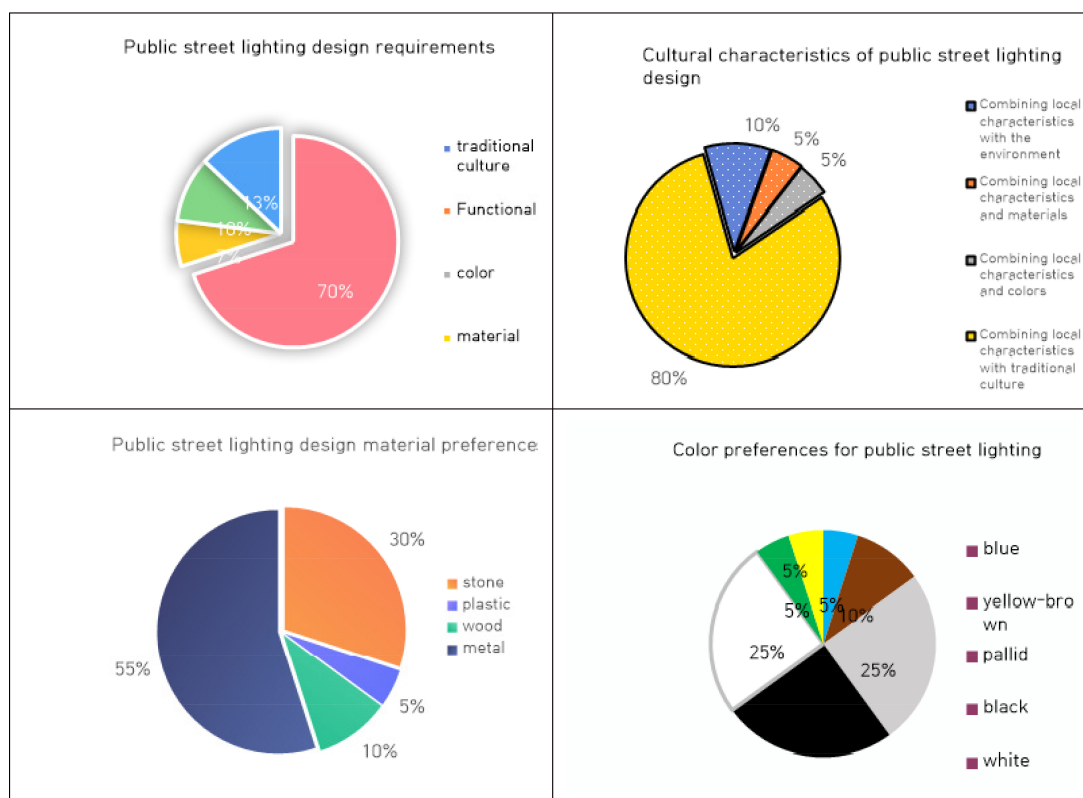


Fig. 9. Questionnaire survey data

Based on the analysis and statistical data from the survey respondents, it is evident that the design of street lamps should incorporate regional cultural characteristics, as this is highly valued by the majority of individuals. Attention should be focused on preserving and highlighting traditional cultural aspects. Additionally, functionality and material selection are important factors that should be improved to achieve better integration with the environment and culture.

Regarding the design of public street lighting, respondents expressed the highest level of concern for the incorporation of local characteristics and traditional culture, followed by the importance of considering the environment and materials. The survey data indicates that the

majority of people prefer street lights made of metal, with stone as the second popular choice. These materials are preferred due to their practicality and durability as outdoor public facilities. When it comes to the color preferences for public street lights, many individuals opt for neutral tones such as black, white, and gray. This reflects a preference for simple and elegant color schemes.

By analyzing the relevant data, several key conclusions can be drawn from the respondents' suggestions for public street lighting designs. Firstly, it is essential for designers to thoroughly explore local historical and cultural elements in order to meet the spiritual needs of the community. Secondly, the significance of culture should be given due attention, thereby preserving and promoting the traditional culture specific to each region. Thirdly, the design of public street lights should harmonize with the surrounding landscape, ensuring a seamless integration into the environment. Lastly, it is important to establish a foundation for the design of public street lights, providing a framework for future improvements and innovations.

3.3 Extraction of traditional cultural elements

Adhering to the principle of simplicity and emphasizing content-based designs aligns with the cultural philosophy of Huangshan. By incorporating visual symbols, the order can be adjusted and blended to achieve a genuine fusion of concepts and physical objects. This approach resonates with the aesthetic preferences of modern society. Symbols and graphics are commonly employed to disseminate information and evoke emotional responses. To attain successful design outcomes, complex graphics need to be extracted and abstracted while still maintaining recognizable features (Wang, 2023).

Based on the survey, it was found that 30 participants chose wood carvings and buildings from Huangshan as representatives. Wood carving was specifically selected based on landscape carving patterns.

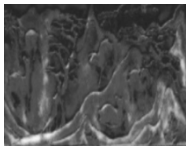



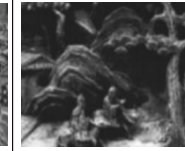
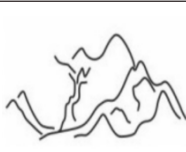
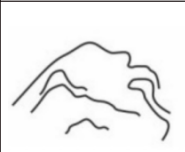
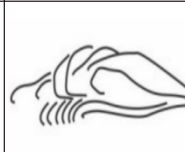

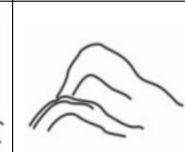
Extraction process of traditional cultural elements in Huangshan					
Landscape wood carving					
Extract patterns					

Fig. 10. Extraction of landscape wood carving patterns

The architecture in Huangshan is renowned for its remarkable beauty and distinctive characteristics. The traditional white-walled and black-tiled buildings create an alluring color scheme that has stood the test of time. Notably, the architectural design in Huangshan incorporates the unique feature of a “horse head wall”. As a very special wall structure of Hui style architecture, it may be named because of resemblance to the horse’s head (Yu, 2022). The symbol of the “horse” represents an embodiment of ancient cultural elements, showcasing the remarkable cultural prowess of that era in effectively employing animals to convey meanings. Consequently, it is imperative to regard architecture as a representative element of Mount Huangshan.

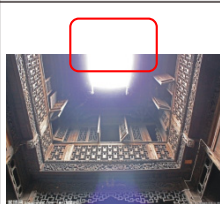


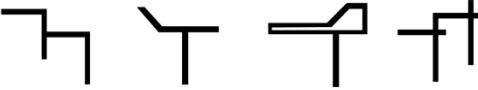




Constructed materials	Extraction of patterns	Meaning
		The high walls, small windows, and enclosed ancient buildings are mainly illuminated through the ceilings and courtyards. Looking up at the sky forms a unique temperament.
		It not only satisfies the function of the building, but also has a certain decorative nature. Seen from the side, the horse head wall is very unique. It is a patchwork of heights and heights. It is the most important sculptural element in Huangshan architecture.
		In order to meet their psychological safety needs, the windows in the building are very small. High walls and small windows make up the unique proportions of the building, which is also a typical element of architecture.
		The size and refinement of the door is a symbol of status, and the installation in front of the door emphasizes the volume of the entrance and emphasizes the importance of the entrance in architecture.

Fig. 11. Extraction of patterns in architecture

There are many types of border textures in Huangshan’s architectural decoration, which embody the ancient ancestors’ yearning for a healthy and prosperous life, every pattern and pattern represents an auspicious meaning or a beautiful legend, with profound connotations and thoughts (Tian, 2023). These border textures are used to decorate buildings, making the whole building more unique.



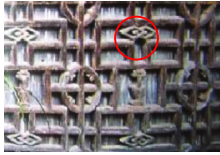



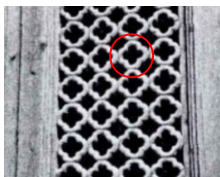



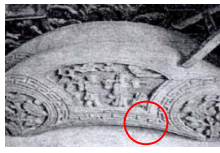

Type	Patterned	Significance
		The image characteristics of the swastika pattern are expressed in a cross-shaped horizontal and vertical form. Various lines are drawn over and over again to form a shape characteristic that runs through the lines, which reflects a sense of expansion with rhythm. (Zhi Qing, 2014)
		The characteristic of the Fangsheng pattern is the shape of intersecting diamonds. Express your best wishes for spiritual communication and convey the meaning of good fortune.
		The symbolic image of the currency has two old currency patterns. The square victory pattern represents the unity and continuity, represents the Chinese people's desire and hope for a better life and marriage, and also shows people's infinite desire for life and the hope for a lucky and healthy life. (Wei Yuanyuan & Zhang Yixiao, 2017)
		Plum blossoms symbolize happiness, happiness, longevity, success, and peace. Plum blossoms in nature bloom in winter and are thought to be the personification of high purity. The plum pattern inherits the personal feelings for plum blossoms and is used in all areas of life.
		The back pattern evolved from the cloud and thunder pattern is one of the oldest decorative patterns in China. (Song Yao, 2014) A circular pattern is a skylight line rolled into a circle or folded into four corners. The pattern is very long and symbolizes beauty.
		The "T" frame pattern, which is most used in buildings, not only enriches the entire picture, but also plays a visual role in balancing the overall texture of the building.


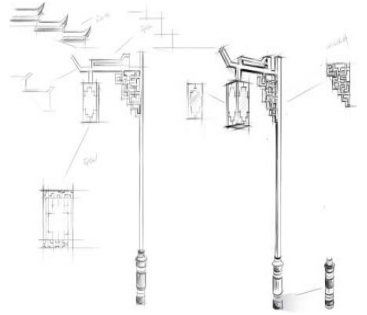
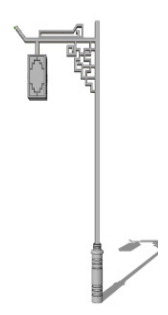
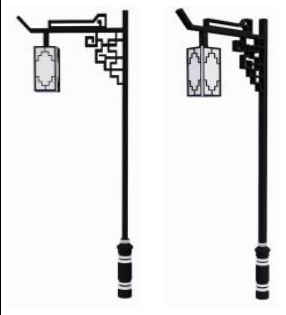

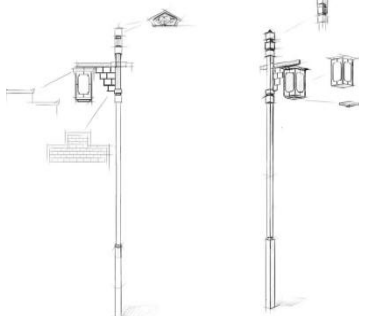



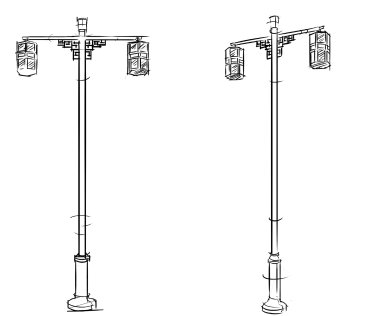


Fig. 12. Extraction of patterns in building doors and windows

Through research, some elements were selected and extracted from Huangshan culture, and these were transformed into graphics and forms, and processed into graphic elements that conform to the aesthetics of modern people.

3.4 Development of street lighting design for Hong village scenic area

3.4.1 Street lights

Because of their unique height, street lights are the most prominent product in public street lighting design, and are also important objects for night lighting. As the most important facility in outdoor public street lighting design, it is necessary to design and develop street lighting design as such.

Design proposal			
① Design location	② Hand drawn sketch	③ 3D models	④ Finished product
			
<p>Design description: The “horse head wall” element in Huangshan’s architectural culture is inspired by the design of the upper part of street lamps. It aims to enhance and simplify the geometric forms, such as the “back lines,” that are used to adorn the exterior of the street light design.</p>			
			
<p>Design description: Among the cultural elements embedded in Huangshan architecture, geometric shapes are incorporated on the walls to create simplified designs. The concept of the lampshade-shaped street lights draws inspiration from the architectural design of the “eaves” found in buildings.</p>			
			
<p>Design description: Simplified designs are achieved by incorporating palindromic patterns inspired by architectural elements. With simplicity as the core principle, modern design seamlessly blends with the surrounding environment and architectural style.</p>			


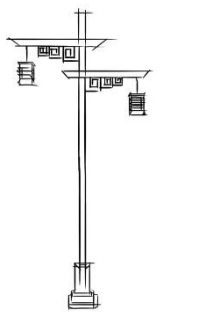
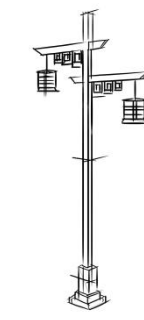
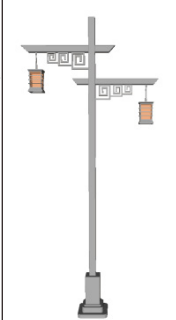
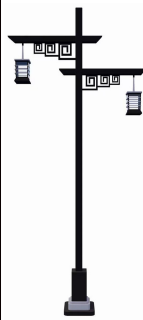

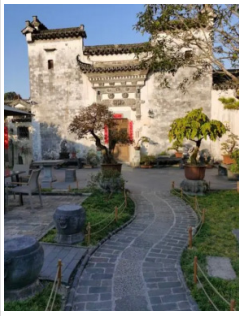
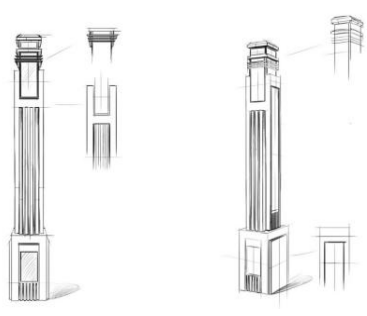
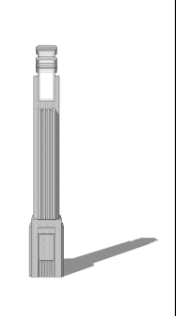

					
Design description: The overall design has a sense of hierarchy and uses the characteristic forms of the building to simplify it, making the overall design more vivid.					
Design criteria and rationale					
Size design proposal	1. Scenic area road lights 3-5m. 2. Adequate lighting is provided, and the pedestrian activity area provides visual comfort and safety. (Determined according to actual use location and surrounding environment.)				
Material	1. Metal material 2. Plexiglass, PVC lampshade				
Color	Color elements of the black, white, and gray series in Huangshan architecture.				

Fig. 13. Design and development of road lights

Landscape lights play a vital role in enhancing the visual appeal of the Hong village Scenic Area, adding a touch of elegance and beauty. Furthermore, landscape lights serve as a means to highlight the historical and cultural significance of the landscape, while ensuring seamless coordination with the surrounding environment. Continuous efforts have been made to enhance the design and development of landscape lights, improving their aesthetic appeal and identifying suitable locations for their placement throughout Hong village.

Design proposal			
① Design location	② Hand drawn sketch	③ 3D models	④ Finished product
			
Design description: Using the shape of Huangshan architecture, the top of the landscape, etc. was inspired by the shape of Huangshan architecture, simplified to design techniques of combination and integration, and modernized with a vertical design feel.			

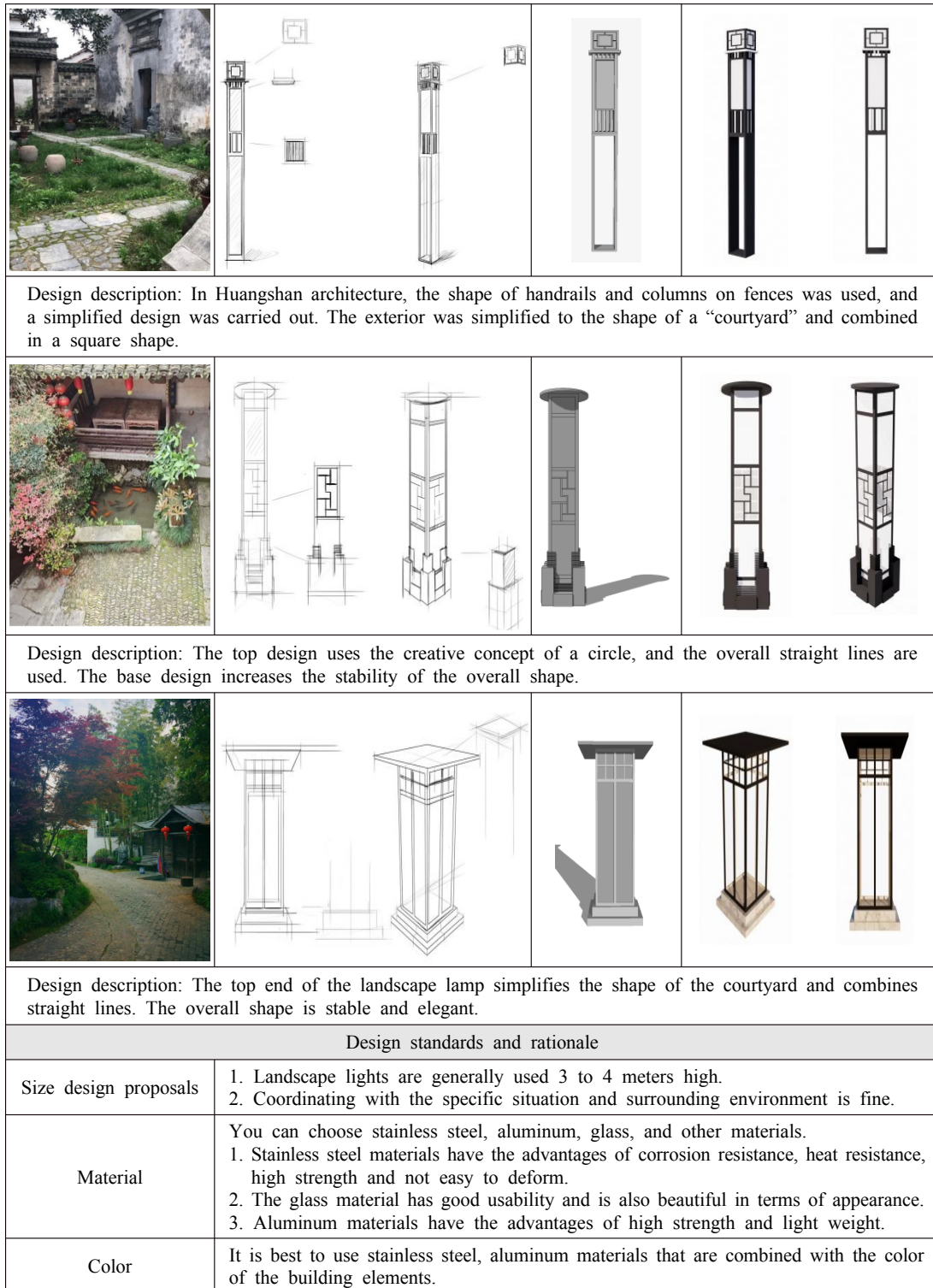



Fig. 14. Design and development of landscape lights

The wall lamp has the characteristics of being diverse and beautiful. There is no uniform standard for its shape, so the quantity and shape of its requirements can be set according to environmental conditions and other conditions. Combining the form of a wall lamp with the architectural cultural elements of Huangshan is very meaningful and innovative.

Design proposal			
① Design location	② Hand drawn sketch	③ 3D models	④ Finished product
			
Design description: The overall shape of the wall lamp uses the design form of a gazebo in the scenic area, simplifying it, and is in line with the environment of Hong village.			
			
Design description: The middle part of the wall lamp is similar to the shape of a patio in a building. The upper and lower parts of the product are made of glass, and the overall color transmission is good.			
			
Design description: The design of the wall lamp in the scenic area draws inspiration from a section of the courtyard roof, resulting in a simplified shape. The inclusion of vertical lines in the middle, combined with the curved structure at the bottom, adds a sense of hierarchy to the overall design.			


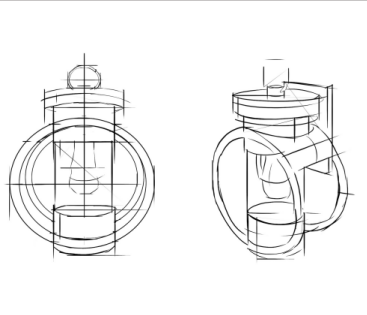


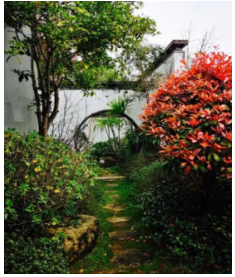
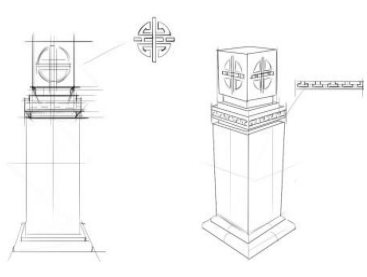
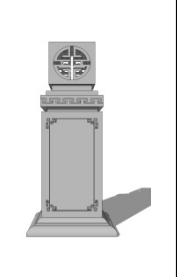

			
<p>Design description: The central section of the wall lamp adopts a cylindrical design, commonly found in architecture. Circular decorative elements are incorporated in the front and rear designs, giving it a lantern-like appearance. The overall shape of the wall lamp bears resemblance to a lantern, adding to its visual charm.</p>			
Design criteria and rationale			
Size design proposals	<p>1. The size of walls, etc. is mainly distinguished by the height of the lamp. The large ones are 450-800 mm, and the small ones are 275-450 mm. 2. According to the diameter of the lamp shade, the large one is D150-250 mm, and the small one is D110-130 mm. (Source of data: https://www.zhuzhai.com/news/read-28640.html)</p>		
Materials	<p>You can choose stainless steel, aluminum, copper, glass and other materials. 1. The quality of a lampshade mainly depends on how translucent it is. The lampshade is generally made of metal. 2. Glass materials have the advantages of good light transmission and high temperature resistance.</p>		
Color	<p>It is best to combine metal materials, glass materials, waterproof materials, and building colors.</p>		

Fig. 15. Wall lamp design development

Lawn lights are widely utilized as markers and navigational aids, guiding individuals along paths, walkways, and gardens. Their primary function is to ensure safety by preventing accidents during nighttime strolls, minimizing the risk of tripping and falling. In addition to their practical purpose, lawn lights contribute to the aesthetic appeal of outdoor spaces, illuminating and enhancing the beauty of the surrounding landscape (Zhang, 2021). These lights effectively draw attention to trees, plants, gardens, and other elements of the scenery, resulting in captivating visual effects. Consequently, the inclusion of lawn lights as objects of design development is essential.

Design proposal			
① Design location	② Hand drawn sketch	③ 3D models	④ Finished product
			
<p>Design description: The lampshade of the street lamp features a hollow geometric design that incorporates architectural elements with geometric patterns. This design choice allows for a harmonious integration of lighting with the surrounding environment and architectural style. Moreover, this design also serves to beautifully reflect the elements of Huangshan culture, enhancing the overall aesthetic appeal of the street lamp.</p>			


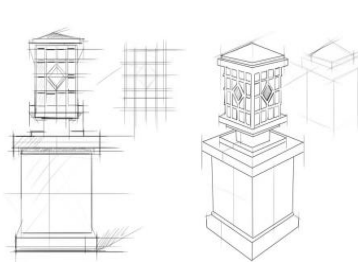
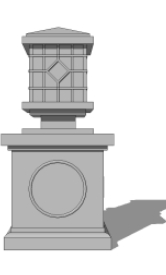


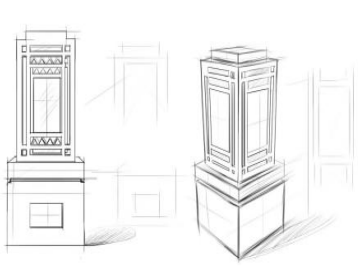
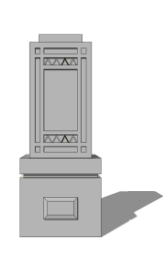


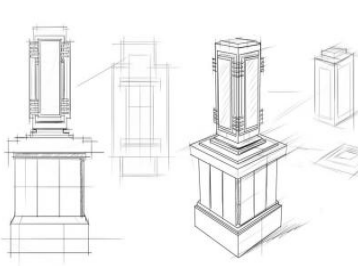
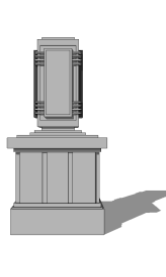

			
<p>Design description: The architectural elements were simplified and remodeled using geometric patterns. It consists of two parts: a lampshade and a light base. The overall shape conforms to the surrounding environment and architectural style.</p>			
			
<p>Design description: The window shape of the building is applied to the lampshade design of the lamp. Simple straight lines are decorated to harmonize the surrounding environment and architectural style.</p>			
			
<p>Design description: The rectangular shape is the appearance of the street lamp shade. The appearance of the street lamp shade is inspired by the patio in the garden, and the square shape has harmonious and stable characteristics.</p>			
Design criteria and rationale			
Size design proposals	<ol style="list-style-type: none"> 1. Generally, the height of a lawn lamp should not exceed 1.5 meters. 2. If there is no cover around, you can choose a lawn of 50 cm or less, and it is best to choose a lawn of about 60 cm for flower beds. 		
Materials	<p>You can choose stainless steel, aluminum, copper, glass and other materials.</p> <ol style="list-style-type: none"> 1. Metal materials have excellent structural characteristics, can be made into various shapes, and surface treatment is easy. 2. Glass materials have the advantages of good light transmission and high temperature resistance. 3. Natural stone is beautiful and durable, but expensive. 		
Color	<p>It is best to combine metal materials, glass materials, waterproof materials, stone materials, building colors.</p>		

Fig. 16. Lawn lamp design and development

Color plays a crucial role in product design, as it is the most immediate visual factor that captures people’s attention. In the mid-19th century, psychology shifted from philosophy to science, and psychologists paid more attention to the influence of color on human psychology (Zheng & Wang, 2023). The purpose of color design in products extends beyond the mere combination of colors; it also takes into account individuals’ psychological reactions to color combinations. Color evokes emotions and triggers a range of psychological responses when perceived by the human eye (Yang, 2023). In product design, color communicates vital information, enhances the product’s character, and conveys visual messages. Therefore, color has emerged as a key determinant of the success or failure of a product’s design. In the context of street lighting design, it is essential to select colors that not only intuitively resonate with viewers but also authentically capture the cultural elements of Huangshan Mountain. By incorporating cultural elements, considering environmental factors, and taking into account preferences in color among residents, a harmonious and unified beauty can be achieved through the interplay of colors.






















Color update	Chromatographic updates	Color update	Chromatographic updates
	 RGB 0/C93 M88 Y89 K80  R255 G255 B255 /CMYK 0  RGB 208/C20 M19 Y19 K0		 RGB 0/C93 M88 Y89 K80  R255 G255 B255 /CMYK 0  RGB 208/C20 M19 Y19 K0
	 RGB 0/C93 M88 Y89 K80  R255 G255 B255 /CMYK 0  RGB 208/C20 M19 Y19 K0  R186 G168 B132/C33 M34 Y50 K0  R208 G195 B189/C22 M24 Y23 K0  R112 G101 B95/C63 M61 Y60 K0		 RGB 0/C93 M88 Y89 K80  R255 G255 B255 /CMYK 0  RGB 208/C20 M19 Y19 K0  R229 G202 B170/C13 M24 Y35 K0  R128/C57 M48 Y45 K0

Fig. 17. Color scheme for street lights

In the aforementioned four sets of plans, each type of street light is thoughtfully designed in four different forms, taking into consideration the shape and function required for street lights in the Hong village Scenic Area of Huangshan City. These designs are also intended for the development of public street lights in other locations within the scenic area. The external appearance draws inspiration from classic Huangshan cultural elements, such as horsehead walls, eaves, ceilings, landscapes, and window patterns. These elements are simplified, refined, and reconstructed to create abstract and modern visual graphics that are incorporated into the street light design. When selecting materials, practical considerations were taken into account, and the colors of Huangshan cultural elements were used for the exteriors. This design not only resulted in the development of a comprehensive series of Hong village public street lighting, but these designs can also be applied to other scenic spots and streets throughout Huangshan City.

4. Conclusion

Huangshan traditional culture, as a small part of Chinese culture, holds significant importance in the inheritance and dissemination of Chinese ethnic culture. Cultural transmission relies on two critical conditions: platforms and carriers. Huangshan City, being the birthplace of Huangshan culture and a globally renowned tourist city, serves as an excellent platform for the dissemination of Huangshan culture. The graphic arts of Huangshan culture contain numerous decorative patterns. By extracting and reconstructing these traditional patterns, integrating them into the public street lamp design of Hong village Scenic Area in Huangshan City, the lamps become carriers for the dissemination of Huangshan culture. Through research on the application of Huangshan culture in different design fields and the application of regional culture in public street lamp design, the following conclusions can be drawn from the survey results:

1. The preservation and development of Huangshan culture, as a national cultural heritage, are of great significance.
2. Analyzing the current state of lamp design provides directional insights for future developments.
3. Based on the inheritance and development of Huangshan traditional cultural elements, design principles and proposals for public street lamps in Hong village Scenic Area and surrounding tourist areas can be formulated. Innovative transformation plans and development, promotion, and the creation of more locally fitting public street lamp designs are possible.
4. The proposal for street lamp design with Huangshan traditional cultural elements includes borrowing architectural elements, using architectural colors, and connecting with the scenic environment.

Four sets of design proposals are summarized for common public street lamp designs based on their functions and forms. The application of Huangshan cultural elements in public street lamp design is demonstrated and refined from various perspectives, including innovative forms, color application, and material selection, and is verified through design practice. In the design, the features of Huangshan architecture are summarized and applied, resulting in a simple and elegant form rich in cultural charm. Such attempts underscore the necessity of applying traditional culture to public street lamp design, holding important significance and reference value for the future development and planning of various public facilities. It is hoped that the proposals from this study will contribute to the advancement of street lamp design and planning.

Conflicts of Interest

No author has any other conflict of interest to declare.

References

- Chu, X. (2017). Brief analysis on the differences between nordic and japanese simple design styles. *Art Science and Technology*, 07, 267.
- Fan, T. (2017). Regional research on urban street lamp design. *Shaanxi University of Science and Technology*. <<https://www.cnki.net>>.
- Luo, H. (2022). Study on the shape design of urban street lamps based on locality - A case study of street lamps in Chongqing science city. *Sichuan Fine Arts Institute*. <<https://www.cnki.net>>.
- Song, Y. (2014). Aesthetic value of Hui-shaped decorations in Huizhou. *Journal of Anhui University of Science and Technology (Social Science Edition)*, 16(01), 105-108.
- Source of data. <<https://www.zhuzhai.com/news/read-28640.html>>.
- Tian, T. (2023). Application of traditional chinese patterns in the decorative design of Huizhou ancient buildings. *Popular Arts (Art and Design)*, 58.
- Wang, W. (2023). Influence of Dunhuang Feitian color art on visual communication. *Popular Colors*, 06, 109-111.
- Wang, S. (2023). Research on the design of cultural and creative products based on the integration of creativity and cultural symbols. *Shanghai Packaging*, 10, 157-159.
- Wei, Y., & Zhang, Yixiao. (2017). Application of China traditional Fangsheng patterns in modern logo design. *Art and Technology*, 09, 267.
- Xun, S. (2023). Comparison and application of cultural design concepts in the middle east and the west in graphic design. *Footwear Technology and Design*, 03(17), 94-96.
- Yuan, X., & Zhang, D. (2023). Settlement visits: Analysis of spatial layout characteristics of Huizhou traditional villages - Taking Hongcun and Xidi as examples. *Changzhou Wujin Planning Survey and Design Institute*, 5-7.
- Yu, Z. (2022). Application of horsehead wall in modern architectural design. *Journal of Jingdezhen Ceramic Institute*, 37(06), 125-128.
- Yang, C. (2023). Function and influence of color composition in modern product packaging design. *Green Packaging*, 10, 81-84.
- Zhi, Q. (2014). Modern deduction of traditional patterns in China - Taking Wan Ziwen as an example. *China National Expo*, 44-46.
- Zhang, Y. (2021). Research on lawn lamp design under the background of new media technology. *Light Source and Lighting*, 03, 36-37.
- Zheng, Y., & Wang, Y. (2023). Analysis on the application of color in product design. *Leather Culture and Design in Western China*, 114-116.

