

# The Design Strategy of Macau's Public Transport Stations from the Perspective of Regional Culture

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**Abstract:** *With the increasing demand for material and culture, today's urban residents are no longer satisfied with the current rigid infrastructure design. Therefore, it is very important to improve the overall image of the city through the implantation of the regional culture of the city, and to create an urban atmosphere with its own characteristics to solve the current problem of the city's "one-thousand-cities" problem. As a common tool for residents and tourists to travel daily, buses are widely used in cities and can subtly display and convey the spiritual connotation of the city. Therefore, this paper analyzes existing problems through field investigations of public transit stations in Macau, and combines Macau's regional culture and related design theories, and proposes to meet Macau's local characteristics from the aspects of function, shape, color, material and humanity.*

**Keywords:** *Regional culture, city image, bus stop design*

## 1. Introduction

With the rapid development of the economy, the construction speed of cities has also been increasing along with the explosive growth of the population. In order to meet people's daily needs, urban construction often pursues speed and quality while ignoring its own cultural characteristics. This has created the problem of "one thousand cities in one face" in modern Chinese cities. The city of Macau has a unique history and profound cultural connotations, and it should not be obliterated by the rapid development of the city itself. However, it may be more difficult for everyone to go to the cultural center to understand the history and culture of Macau. However, through the detailed design of the city, the residents or tourists of the city can experience the humanistic feelings and spiritual outlook of the city from the subtleties. Therefore, as a frequent use point for people's daily travel, the bus station is a good carrier to convey the regional culture of Macau and shape the image of the city<sup>[1]</sup>.

## 2. Overview of Macau Bus Stations

### 2.1. Current Status of Public Transport in Macau

The Macau bus service adopts a "government-led, market-operated" mode of operation, in which the government undertakes a series of leading tasks such as bus route planning, station setting, and bus schedules. The two bus companies (Xin Welfare and Macau Bus) under the supervision of the government, the management from vehicles, equipment, personnel operations and back-end control are handled to ensure that citizens can use bus services safely, time-saving, convenient and comfortable.

There are currently 81 bus routes in Macau. According to the information of Macau bus stations, there are 242 bus stations in Macau Peninsula, 119 bus stations in Taipa District, 48 bus stations in Coloane District, totaling 409 bus stations. It can be seen that Macau's public transport stations basically cover all places in Macau, making Macau residents and tourists the best choice for travel. Although the bus stops provide convenience for passengers to travel. However, due to the density of bus stations, it also causes traffic congestion to a certain extent. At the same time, the standardized design of public transportation stations also makes Macau miss the opportunity to create an urban atmosphere and establish a city image.

### 2.2. Problems in Macau's Public Transport Stations

There are many shortcomings in Macau bus stations. The overall appearance of the facilities is

relatively simple, and the facilities are not complete. As a result, the services of the bus stations have not reached the standard required by people in daily life. At the same time, the markings of the signs are also lacking in recognition.



Figure 1: Current status of bus stations.

### 2.2.1. Lack of distinctive appearance

There are two main types of bus stops in Macau. The first is an independent stop sign, which is made of metal material only with brick-red paint, and is relatively isolated; the second is a stop sign and a semi-enclosed waiting space with the same material. It is made of metal, mainly in the primary color of stainless steel, and part of the waiting space will be equipped with translucent plastic windshields. The shapes of these two bus stations are relatively cold, and are similar to the designs of other cities, lacking the local characteristics of Macau. This modular design will make passengers feel bored, and they will not feel the comfort and safety of the facility.

### 2.2.2. Imperfect infrastructure

Among the above-mentioned two types of bus stations in Macau, only some of the bus stations will be equipped with windshields, and less equipped with resting seats, public trash bins, etc., which causes inconvenience for the people to use. The lack of metal seats and windshields can even lead to a poor waiting experience due to the drop in temperature in winter and the increase in monsoon. In addition, there is a lack of corresponding lighting systems, which causes inconvenience in reading information at night. And bus stops with only stop signs will give passengers a worse waiting experience. In addition, there are almost no relevant designs for special populations such as the elderly, the weak, the sick, and the disabled. Therefore, Macau's bus stops have not yet been able to meet the diverse needs of the population in modern cities.

### 2.2.3. Poor recognition ability of the guidance system

The biggest difference between Macau's bus lines and the mainland is the asymmetry. The bus route is basically a loop, and there may not necessarily be a bus stop on the same route on the opposite side of the road at the same stop. Therefore, whether the guidance system of the bus stop can quickly and concisely allow passengers to read effective information is very important, but at present Most of the indication systems of Macau bus stations only indicate the circle information and the corresponding stations, and there is no information on the transfer points and temporary changes or construction of some stations. This not only causes dyslexia to a certain extent, but also causes passengers to miss the trip.

### 2.2.4. Design lacks humanistic features

As a diversified and integrated modern city, Macau should allow passengers to have a clear understanding of the environment when waiting for the bus, and be able to feel the cultural atmosphere or local cultural features brought by the city. But the existing bus stations in Macau are all standardized designs, lacking humanistic feelings and connotations, and it is difficult to give passengers a better experience.

## 3. Regional culture integrated into Macau bus station design

### 3.1. Macau City Overview

Located in southern China, Macau is one of the world's four largest gambling cities, an international free port, and the world's tourism and leisure center. Macau has a total land area of 36.8 square kilometers.

There are seven parishes under its jurisdiction. Although the area is small, it houses 680,000 people. It is one of the most densely populated areas in the world. There are thousands of tourists visiting here. This shows that the demand for public transportation in Macau is huge. The unique geographical location surrounded by the sea on three sides has laid the tone for Macao's opening to the outside world and a heart for the motherland. In the changes of history, different cultures such as the Chinese cultural system, the Portuguese cultural system, and the Islamic cultural system converge here. Different ethnic groups multiply and thrive here. As the generations of people grow up, their cultures continue to expand and converge. Gradually, this has created the coexistence of multiple ethnic cultures in Macau.

### 3.2. Analysis of Macao's Regional Culture

Macau has gradually developed from a small fishing village that no one cares about into a hot modern city. All aspects of the city have confirmed Macau's profound historical heritage. The first impression of modern Macau is often the "gaming city" of the East, but Macau is more attractive because of its unique and diverse culture. In the historical changes, Macau has perfectly integrated the European culture of more than 400 years, especially the Portuguese culture and the Chinese culture. It has both the implicit and introverted Chinese culture and the leisure and romance of European style. The urban pattern of Macau still retains the cultural landscape and leisure life rhythm and atmosphere of small towns in southern Europe. It can be said that this is the greatest charm of Macau as a tourist city in East Asia, and it is also the difference between Macau and other tourist cities in the world<sup>[2]</sup>. Macau is dotted with the oldest, well-preserved, and largest complex of buildings in China. These buildings are by Western-style buildings, and incorporate Chinese and Western cultures, especially the cultural essence of China and Portugal. With the construction of modern new attractions such as the Macau Tower, Macau Cultural Center, and Fisherman's Wharf, Macau has added features of ancient and modern cultures, forming a unique scene of multicultural integration today.

Based on the research theory of the scholars of Zhenyu Chuai and the author's understanding on the regional culture and historical development of Macao, the regional culture of Macao is summarized and classified<sup>[3]</sup>, and the content is summarized in the following table:

Table 1: Macao Cultural Classification Table.

Cultural classification	example
religious culture	religious culture Buddhism: establish Bodhi Temple, Zhulin Temple, Leshan Temple, Gongde Forest, etc.; Taoism: To worship the Queen of Heaven, Mazu, establish Lianfeng Temple, Lianxi Temple, Tan Gong Temple, etc. Catholicism: Catholicism has a wide range of social welfare services in Macau, including 32 organizations such as nursing homes, orphanages, youth centers, and community service agencies, affecting more than half of the population of Macau. Among the buildings related to Catholicism are the Jesuit Memorial Square, Rose Hall, St. Augustine Church, Benevolent Church Building, Lobby (Cathedral), etc. Others: Macau also has Christianity, Judaism, Islam, Mormonism, Christianity, etc.
language culture	Chinese, Portuguese, English
Architectural culture	Chinese classical tower-style A-Ma Temple, "Baroque" style St. Paul's, Spanish religious-colored lobby, Portuguese-style Governor's Mansion, dome-style Islamic mosque, etc.
business culture	Ming Dynasty: Become a foreign trade port and serve as a transit point for trade routes; Qing Dynasty: The function of foreign trade transfer gradually declined, and the gaming industry opened up and gradually became an important part of Macau's economy During the period of the Republic of China: mainly export fishery, gambling industry gradually developed After the war, the gaming industry and the tourism industry have promoted each other, the gaming industry has gradually become the primary industry in Macau, and the financial industry and commerce have developed vigorously.
Customs and culture	China: Chinese Spring Festival is the beginning of the new year, and traditional special festivals such as Dragon Boat Festival, New Year's Day, Mid-Autumn Festival, etc.; Western: Christmas as the new beginning of the year, as well as the Feast of Immaculate Conception, Saint John's Day, etc.
art culture	China: Cantonese opera, native-language drama, Mazu beliefs and customs, salt water songs, etc.; West: Portuguese tile painting production, etc.

### **3.3. Design considerations for bus stops**

According to the research of Xianghong Gu scholars, the design consideration factors of bus stops are divided into the following five types: functional factors, color factors, material factors, styling factors and ergonomic factors. These five factors are used to comprehensively consider whether the design of the bus station meets the four major aspects of functionality, convenience, aesthetics, and safety<sup>[4]</sup>.

#### **3.3.1. Functional factor**

The function of the product directly affects the use value of the product, which is very important for a product. Therefore, as a public facility where people wait for the bus, the bus station must be useful. Used for example: bus line signs, bus shelters, the configuration of these infrastructures can form a complete bus station, so that it has practical functions.

#### **3.3.2. Color factor**

For human visual sense, color is the most intuitive feeling of human beings. People can identify the space or product through the choice of color. Therefore, bus stops color choice is very important factor, the local characteristics should not only conform to the city in harmony with the surrounding environment, but also aesthetic, function, and the psychological demand of users.

#### **3.3.3. Material factors**

The choice of materials for the bus station is firstly related to the service life and firmness of the bus station, and secondly it also affects the product style. According to the needs of zoning characteristics and styling characteristics, bus stops can be designed with different materials. In the existing bus stations, commonly used materials include stainless steel, wood, stone, glass, etc. Considering the maintenance cost and durability, standardized bus stations generally used stainless steel, aluminum profiles and composite materials in the past. However, with the development of modern science and technology, more materials can be mixed and used to improve the quality of bus stations.

#### **3.3.4. Styling factor**

The design of the bus station should also pay attention to the shape design. While satisfying the basic functions of the product, it pursues the beauty of the product's shape, making it artistically characteristic. It needs to be compatible with the local culture to reflect the local spiritual culture and urban atmosphere. The design of the bus station need to combine with the natural style of the city and the urban planning.

#### **3.3.5. Ergonomic factors**

Humanization is an important consideration in today's design results. If a design deviates from this element of humanization, it is equivalent to ignoring people's emotional needs and people's usage habits, then the design results are unsuccessful. Therefore, it is indispensable to consider ergonomic factors when designing bus stops. In addition, in the face of the diversification of society, the design of products should also consider the usage habits of different groups, especially special groups. By increasing the care for the elderly, the weak, the sick, and the disabled, the products are more humanized, so that Users get a better experience.

### **3.4. Design strategy of integrating regional culture into bus stations**

#### **3.4.1. Divisional classification of bus stations**

Through relevant research on the regional culture and development background of Macao, it can be found that due to the different cultural influences experienced by Macao in different development periods, a certain differentiation of architectural styles has been formed. Therefore, when designing the appearance of the bus station, the corresponding characteristics can be extracted according to the zoning of Macau, so that the bus station presents a different tone. At present, Macau's divisions are mainly divided into North District, East District, Central District, Outer Port District, Taipa District, Beian District, Cotai District, Coloane District, and the new campus of the University of Macau. Then, Macau's 409 bus stations can be divided through these 9 sub-regions, and combine the history of Macau's urban development in the classification process, summarizing the characteristics of different regions and sorting out the expression themes in different regions. Considering the connections between different themes , so that the final overall design is continuity.

### 3.4.2. The implantation of Macao cultural symbols

After categorizing the bus station zones, the characteristic content within the zone should be focus on refining. The refinement and expression of symbolization should not only be limited to the elements of characteristic buildings, but also the memory of Macau. The features of Macau in different time periods should be extracted, symbolized in different districts, and then implanted in bus stops. Through the carrier of symbols, information can be transmitted and exchanged quickly and straightforwardly. On the one hand, the expression of symbols creates a unique regional cultural atmosphere in the area; on the other hand, passengers can quickly understand the region they are in and feel the regional spirit of the region through cognition of the symbols. Secondly, in symbolic expression, it should not be limited to traditional presentation methods such as graphic decoration and reliefs, but should adopt diversified modes to enhance the interaction between design works and the public, and make regional culture in a more novel way.

### 3.4.3. Material selection for bus stops

Different materials will give passengers different experience. The choice of materials is very important to the design and use of bus stops. Not only should the aesthetics be considered, but also the influence of seasonal temperature differences. We should be considered to create comfortable bus stops while minimizing maintenance costs. According to the summary of bus station materials, it can be selected and comprehensively used after consideration of station design expression, cost analysis, and operation.

Table 2: Advantages and disadvantages of materials.

material type	advantage	Disadvantage
wood	Has a good touch and texture; low thermal conductivity; conducive to expressive design and processing.	It is not conducive to preservation; it has poor resistance and is susceptible to wind and rain erosion; it needs regular maintenance.
Stone	Has strong durability	The material is hard, hot in summer and cold in winter; it is not conducive to processing.
Concrete	It has strong durability; the price is relatively cheap; it can be cast-in-place production according to demand.	The material lacks comfort.
metal	Conducive to processing; good texture. High strength and corrosion resistance.	The material has strong thermal conductivity; it is susceptible to changes in the use temperature caused by seasonal changes;
ceramics	The texture is good; the shape is flexible and changeable.	It is susceptible to changes in the use temperature caused by seasonal changes; the processing is cumbersome and the size is limited.
plastic	Conducive to expressive design and processing; colorful colors; low prices.	Prone to aging and fading; need regular maintenance.

### 3.4.4. Color selection of bus stops

The choice of color is not only related to the beauty of its own design, but also affects the surrounding environment. As a part of the road landscape components, bus stops have different symbolic meanings or give passengers different psychological feelings by different colors. Therefore, the color matching of bus stops should be carefully selected. Through summarizing and analyzing the research results of Aimei Ma, the color selection should consider the main color, auxiliary color, embellishment color and background color of the city<sup>[5]</sup>.

Choosing the main color of the city meaning to choose the color that integrates the surrounding buildings. We should adjust the gray scale of the same color system for use when choosing similar colors. This method can promote the overall atmosphere of the city. Choosing the auxiliary color of the city meaning to choose the color that echoes the main color of the city and use a small area, and the purity and brightness of the color should be lower than the main color. The use of auxiliary colors can well support the style of the city and make the whole city harmonious and unified.

Considering the embellishment color in the city, this color is opposed to the main color of the city,

and the area generally used is also small. This color has high purity and brightness, and is easy to form a strong visual effect. It is generally used in important nodes.

When the city is close to mountains and rivers, you can also consider using the background color of the city, blending the colors with nature and making the whole city more vibrant. In summary, according to the different zoning characteristics of Macau, bus stops can choose colors according to the colors of the surrounding environment and the importance of nodes, so that passengers can more closely experience the unique cultural charm of Macau.

#### **3.4.5. Improve the humanization of bus stops**

The nature of the bus station is to serve people, so the humanized design is very important for passengers. Not only ordinary passengers are considered here, but also the use experience of vulnerable groups such as the elderly, young, sick, and pregnant women. In the design of bus stops, patterns and signs should be used to replace pure text content to make the instructions clearer and clearer. At the same time, consideration should be given to design or modification in terms of touch, sound, so that the physically disabled and the visually impaired can use it. They can have a certain judgment on their position, direction, and environment by the bus stops.

Secondly, the facilities of the bus station are also as complete as possible, and the rain shelter and seats can be designed according to local conditions, and the height of the seats should meet the ergonomics, and the height should be set at 40-42 cm. The existing stop sign function is too single. In today's rapid technological development, the use of solar electronic displays should be considered. On the hand, this saves resources to a certain extent, on the other hand, it can also update the bus lines that need to be changed or the current status of bus congestion through the network system, and give passengers timely feedback.

## **4. Conclusion**

As a city display window, the bus station should not only be designed in accordance with the standardization of the past, but only meet the basic functions of waiting for passengers, but should be updated with the continuous improvement of People cultural literacy that follows. We can convey the unique cultural heritage and spiritual outlook of the city through the implantation of regional culture. Macau as a famous city with a long history and multi-cultural integration, the existing bus station design still has bigger room for improvement. As for the design of transportation stations, it is not only the integration of regional cultures, but also multi-disciplinary knowledge. In addition, the intelligent and greening of public transportation stations are the future design directions with the improvement of science and technology. Therefore, in future research, the author will further combine theory with practice and combine art design with modern science and technology to fully carry forward the regional cultural characteristics, integrate traditional culture from the perspective of modern elements, and design a new type of bus station with expected aesthetic value and practical functions to provide theoretical guidance for bus station design.

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