

# Chapter 15

## Research on the Legibility of Urban Rail Transit Square

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**Abstract** Based on improving the city's legibility, the paper puts forward the URT (urban rail transit) square environment design on the requirements of the location, direction, culture and time, Combined with Beijing's instance, it explore how to handle the legibility of the plaza through spatial layout, design details of buildings and material colors.

**Keywords** URT • Square • Legibility • Interface

**Forward.** If the URT (the urban rail transit) is a sign of a contemporary symbol of urban civilization and urban developed public transportation, the rail transit square is an important conversion and exchange place for the urban system and huge URT system underground. Through the design of their environment, not only the evacuation capacity of the station can be highlighted and strengthened and to provide protection for the large crowded dispersal, but also enhance the overall sense of place and legible of the urban spaces, so that people can clearly caught the urban space and strengthen the impression of the place during the hurried commuter process.

### 15.1 The Requirements of Legibility

With the accelerated speed of urban renewal and the complicate of urban ground and the underground transport system, it is very difficult to build a clear impression of the city. This resulted in the lack of recognition on the urban spaces and a lot of

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inconvenience in the city living. It seems that the legibility itself, including the dialogue through space and time annotation between the creator and the viewer. And during the urban space design process, it's important to make sure the observer (commuting public) can clearly and easily interpret the following basic information environment of urban space through environmental design.

### ***15.1.1 The Legibility of the Area and Location***

The legibility of the area and location mainly identify the spatial situation of the observer in the city. Because of standardized design, people in the complex subway system are very easy to loss of location-aware capacity during the travel. Compare with the streets of the ground, underground system lack of the outdoor asymmetry in the larger scene markers, such as the sun, moon and stars and landmarks landscape tips. Especially people may often be a momentary negligence and lost the resolution of location during the tired subway commuter. Sequencely, the similarity of all the city and street and architectural image is also easy to make it difficult to identify the location.

### ***15.1.2 The Legibility of the Direction***

In addition to the need to understand their own situation, People also need to point to more identifying to indicate the target and determine the direction of travel. Generally, these meaningful marks include not only texts and signals, but also more easily described urban spatial information's, for example an special imply of square, street, buildings, trees, flower beds, billboards and even a particular wall which can be easily observed by people on the path to the destination. People need such marks as a guide to obtain more accurate spatial information.

### ***15.1.3 The Legibility of Culture***

In addition to the identification of the spaces, the city itself should also actively create a positive dialogue of spirit between space and observers. Designers need to consider more about the unique characteristics of local culture. This cultural characteristic need not only show the coordination of environmental and geospatial which formed due to characteristics of place, but should form the consensus on the usage of spaces and value orientation between the creators and the observers.

### ***15.1.4 Legibility of Time***

If culture is given to the pursuit of the context inheritance and value stability, the characteristics of the society and the changing times is need to imply by the modern technology development and cultural trends change. Especially in modern time design should advocate the characteristics of the times, marked the ability that advancing with the times which shown in cultural and scientific and technological progressing of the conversion and absorption. It provides opportunities for people to interpret the history of the city through the stone and other building materials epic.

## **15.2 The Legible Requirements of the URT Square**

### ***15.2.1 The Characteristic of the Location's Legibility – Grading Symbiosis of Networks, Lines, Nodes***

That “URT station can be used as an important urban space node” [1] is highlighted in the book *The Image of the City* which was written by the American urban researcher Kevin Lynch. By above on legible issues and combination of the characteristics of URT, of the unique characters of rail transit system and other urban space can be distinguished easily. Location identification has the characteristics as follows:

In the first place, the URT system, as the main network in the city's public transportation, should show unified features in its station square, and the square also distinguished with other spaces such as in the motor vehicle road, the pedestrian street and the ordinary urban residential premises. Therefore, this should distinguish between a rail transit system differs from other urban spaces.

In the second place, the transfer of people is realized by route, and series spaces surrounded rail transit corridor lead lines and organized by route as a whole system. In spite of the overall network characteristics, transit line is an important factor to strengthen the spatial correlation which makes the spaces closely linked. Therefore, the characteristics of rail transit lines in urban design should be highlighted.

In the third place, the city space and urban functions around URT stations should be reconstructed around the square in front of the station as an important place to local situation. In a way, the square in front of the station to become a center of district, it should be reflected in the environmental design.

The identification exist in the whole network system, corridor and nodes, this makes rail transit stations not only has a clear distinction between the other city system, but also combine the line's features with the area's characters, formed the combination of “the same character a line” and “one scene of each station” [2].

### ***15.2.2 The Legibility of Direction – Accurate Mark of the Structures and Spaces***

Urban space requires a clearer identification in addition to rail transit system general location, especially for people to determine the specific urban locations away from the underground urban space to the surrounding areas above ground. Usually the urban spaces on the ground are divided into four relatively independent quadrants by the crossing roads, each corresponding to an entrance plaza. Most of the main roads intersection is impact by the rapid traffic stream, the contact between those squares is difficult. Thereby a clearer identification is required to enhance the sense of direction of the city and to reduce the mis-judgment of direction and more accurate situation.

### ***15.2.3 The Legibility of Culture – Regional Differences of the Urban Spaces***

Urban rail traffic through not only the new district of the city, but also many old town areas. Geographical identification and lots combination of the culture is important for people to get the environmental features at the conversion during the import and export process. After all, the whole impression of people on the first and the last environmental experience to the environment cannot be ignored.

Therefore the square and the entrance of the URT should adapt to the surrounding environment, Different sites of the rail transit station should have the corresponding style and character with the area. While rail transit square design with rich cultural characteristics, the passengers are able to clear understanding of the area and the site's direction. It also reflects the characteristics of the site, and enhances people's memory about local space, helps people integrate lots scattered impression.

### ***15.2.4 The Legibility of Times – The Modern Transit Technology and the Brand of the Times***

Despite the history of the rail transportation is no more than 200 years compare with the long history of urban construction, especially in China is about half the century. However though the 100 years of construction time, technology of construction and operation of the rail transit has been continuously developed and improved, there is rarely any kinds of construction of the city can be seen in the growth process of building construction system. Therefore the mark of the times is shown in the

process during construction is able to reflect in the long period of urban history, it can also emerged in the verified characters in different line of the URT. And also in each different node of a line, although position in space is different, relatively speaking, it is also reflects the whole level of science and technology, and cultural characteristics of the construction period. The design should based on the line, and explore the features of the transport facilities and social or public space which given by the times.

## **15.3 The Specific Styles to Strengthen the Legibility of URT Station Squares**

### ***15.3.1 Spatial Design***

#### **15.3.1.1 Processing of Spatial Form**

It should first be showed in landscape spatial forms processing in strengthening the legibility of the Station squares. Station square spatial form should not only be beneficial to the evacuation but also reflects a system of urban public character and by the enclosed space. At the same time, it needs to be a system of geographical landmark landscape through enclosure walls, flower beds and some architectural pieces of the square. In addition, the design with some bicycle parking space, cooling tower, or wind pavilion surrounded, we can cover some places which are easy to be mixed and disorderly by enclosure and shelter.

For example, in the square designs of Ping'anli and Beihai North stations of the 6th line, which has been recently completed, squares of station was enclosed by the interfaces formed by grey walls, only form an opening direction to the main street, Ping'an street, some low green fence and steps in the opening part both play a certain role of direction guiding and define open interface with its boundary elements. This spatial form echo urban public spatial legibility. In the design of Garden Expo Square landscape of 14th line, the sculpture was put on the oval area in the north of the square, contrast with the surrounding floor coverings and green landscape. Sculpture is made by bending colored steel pipe, which is designed in accordance with the scale of the situation into the landscape of the shape and the image of the track. Garden Expo Station Square design ingenuity in the conception, reflected the traditional Chinese garden landscape with modern sculpture techniques and a strong sense of the times. Installations and illuminational lights play an important role in guiding the crowd and dividing the space.

**Table 15.1** D/Hand the viewer's visual relationship [4]

The ratio	Vertical viewing angle	Observed effects	Spatial feelings
D/H = 1	45°	Observed detail	Close to the sense of local and oppressive
D/H = 2	27°	Observe the main body	Closed space without pressure
D/H = 3	18°	Observed overall (comfortable angle)	Weakening of spatial relationships, absolutely no pressure
D/H = 4	14°	Observation outline	Not a general spatial interaction
D/H = 5	11°	Observe the relationship between squares and environment	Not a general spatial interaction

### 15.3.1.2 Design of Spatial Scale

In addition to fit the functional requirements of the traffic organization, the square and its scale of the enclosure interface should maintain a certain degree of coordination relations to form a suitable degree of enclosure. In many urban space research of the past, the degree of spatial enclosed is often take placed of the ratio of D and H [3], it means the ratio of Plaza distance (D) and the height (H) of around objects. Most of pedestrians walk through the square, so it can be drawn from the past urban research, as shown in the table as followed. After all, the suitable ratio of D and H should between 2 and 3. In this way, the degree of the square enclosed is available and easy to form a positive feeling of space in the city (Table 15.1).

Dongsi and Beihai North station squares consider the relationship between the walls and the square, they are more opening than ordinary Beijing courtyard and more closed than public plaza. The D/H of these plazas are about 3. As Garden Expo Square, it is more learn from the city's public spatial ratio and scale, more open.

## 15.3.2 Details and Design of Structure

### 15.3.2.1 Differences of Detailed Features

During the design courses, URT squares on the same line always have similar style. Squares should changes in unified and look for combination of “the same character a line” and “one scene of each station”. It embodies a local regional and cultural legibility. The master color of URT squares should be similar to the nearby landmarks' color. Contrasting color can be put to highlight the sense of the times in certain degree. These colors form a special texture of material. The colors and textures can make a strong affection, and the texture of color formation is a manifestation of the local regional and cultural identity.



**Fig. 15.1** Ping'anli Station square design

For example, when Square interface is established by brick wall, the texture of the land and combinations pattern can be used as a more delicate handling to make some differences under the whole style. In addition, if the change of paving mechanism, the form of the flower beds, landscape plant species selection, structures skit, stone of a rock garden or image can be combined appropriately, which can play a “unity of opposites” [5] role. It should be noted that, subway square is crowded in many cases, so the arrangement of these marks should be placed in a reasonable spatial position. Preferably, some mark should be appropriately higher than the eye level of average person, so that it can be easily observed and understood. In some cases, the altitude difference between the square base surface and the road base surface can make people more clearly awareness of the significance of the station square as a place space.

### 15.3.2.2 Combined with Other Structures

Rail transit system not only has environmental landscape structures but also many of the structures with the characteristics of its industry requirements, such as subway logo, entrance signs, bulletin boards, prohibit marking, warning signals, road boot logo and advertisement windows. The design of these furniture is usually not belong to the scope of rail construction company, it belongs to the rail operating companies in accordance with its operational requirements (of course, this way deserve to debate and explore). As we can draw above, the location of these furniture in environmental needs to be integration design. These integration efforts need to be further strengthened to reduce the contradictions between the various systems, and improve its overall spatial image and enhance the quality of environmental design (Figs. 15.1 and 15.2).



**Fig. 15.2** The Garden Expo Station Square design

## 15.4 Conclusion

Environmental design requires to fit with both material and spiritual needs. The legibility play a very important role in the urban construction, it can quickly and accurately guide the people informed of its location and direction in the complex network of rail transit. Legibility can also improve the overall identity sense of people to city, and provide more comfortable and interesting life to people in the city.

Rail transit plaza, as a portal of a place, is the place for more and more long-haul commuter people to form the first and last impression, also in the future will become important locations for more people to meet with friends, wait for their loved ones, which can form more people's memory about the city and living events. For designers, the environmental design should be proceeded from big direction, put the impression of the geographical location, direction, culture and age into themselves. The rail transit square needs to start from the pavement and materials, space and scale, conception and practices to strength its legibility as an important part of the rail transit station and urban squares. Only by this way, people can realize the requirements of the different levels of the city and dreams in materialized spaces.

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