

Brief Analysis of the Planning and Design Principles for City Traffic Square

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Keywords: city transportation; city square; traffic square; transportation plan; square plan

Abstract. At present, China is under fast urbanization, the city scale has expanded sharply, people have increasingly more frequent transportations, and the transportation space has become more and more important in city life. The city traffic square combines multiple social activity functions such as transportation, communication, shopping and leisure. The functions of transportation space have become more comprehensive and complicated, which also has higher requirement for accessibility. Therefore, we should analyze and summarize the design principles for domestic traffic square, which can guide the design and construction of traffic square.

1. Research objective

With the continuous development of modern economy, people's material wealth has reached a new level, and their spiritual level has also been continuously improved. More and more people have more time to enjoy the fun of life, and they have higher requirement for urban construction. The 21st century is a period with political, economic and social reform, technical development and active thoughts and culture. With the social development and human progress, people's living standards are improved, and people's pursuit has been improved to the level of spiritual civilization. As an important activity location for people to rest and relax, the city traffic square is a communication location of city culture. In the meantime, the city traffic square is also an indispensable part to improve the city environment, increase the green land system and promote city development.

At present, the Chinese cities have low greening rate and severe environment pollution, the transportation is not optimistic either, and these factors have severely restricted the sustainable development of city. Because various regions in China have extremely unbalanced social and economic development, few city traffic squares have successful development, and most cities are still at an exploratory stage. The Chinese cities are still unable to build high-quality square environment to adequately satisfy the requirement of citizens, there is a lack of related plan, and it is not systematic. This from a certain perspective shows it has become an important topic to adequately utilize limited land source in the city, effectively gather and distribute the crowd, build a harmonious atmosphere of city traffic square and distribute a reasonable traffic square in the city.

2. Planning and design of city traffic square

The planning and design principles for city traffic square are the basis and guidance to well plan the city traffic square, which directly affect the specific scheme and measures of planning and design. The city traffic square is an important component of the city, and its transportation connection to various functional spaces around it is also very important, so the planning of city traffic square is particularly important. For the planning of city traffic square, efforts should be made to systematically arrange the square layout, which should be based on security, convenience and high efficiency. During the design process, in addition to following related standards, certain rules should also be followed.

(1) Integrity of the planning system

A city is a systematic integrity, which has uniformity and complete functions. The main goal in the planning and design of city traffic square is to promote the overall and coordinated development

of different functions of the city. The city is the carrier of people's public life and work, which is an organic integrity from entirety to details. The integrity of city traffic square plays an important role on the aspects of material, psychology and sociology. In accordance with the Gestalt psychology, people's recognition of urban physical environment has the overall "configurational" effect, which is the result of overlaying various individual space locations and perceptual element experiences. This kind of psychology does not only depend on the organic beings, but also depends on the social beings.

The city traffic square is generally the public space opened up in a prosperous city, which has strong attraction and impacts the city, and it also has a dominant status in the city. As an important city space structure, the city traffic square reflects unique city space form and space structural characteristics, which represents deeper social and cultural structure through the form and structural characteristics. The connotations of city traffic square are no longer restricted to its political nature and functions, but it has also entered the city life of citizens, and as a location of city living space, it has built people's spirit and enriched the citizens' life. The design of city traffic square should consider the whole city space system to investigate and recognize the city traffic square from a macro perspective. Based on the research, investigation and analysis, the status and role of city traffic square within the whole city space and the city's social and economic development decides its nature and scale. Based on the researches on city traffic square, which can be specified to the regional transportation of city traffic square, the continuance in layout and connection in transportation should be maintained with the surrounding buildings or environment space form.

In addition, the city traffic square itself also has independence and integrity of space, which can also satisfy the daily activity requirement of citizens. The city traffic square is a regional integrated unit, and within the regional integrity, the economy, society, environment and resources impact each other. Within the square, the dynamic and static space, various functional spaces and transportation organizations, the square space environment and people should be integrated into an organic integrity. By following the integrity of the planning system for city traffic square, it can help make overall planning and design of the transportation of city traffic square and improve its usage efficiency. On the city traffic square, the open space, road and afforestation should form organically by following the regular order, which can reflect the dynamic integrity of its space under certain time and space state.

As part of the urban space, based on its characteristics, the city traffic square can undoubtedly become the force to promote the development of city space, which can intensify the overall city space and guarantee the establishment of spatial order.

(2) Humanization of city traffic square

The humanization principle of city traffic square refers to that during the design of city traffic square, it should be people-oriented. The design of city traffic square should satisfy people's physiological, psychological, material and spiritual requirements. In his book *Design for the Real World*, Victor Papanek pointed out three issues in his design: 1) Design should serve the people, rather than several wealthy countries, and here, he especially emphasizes that design should serve the people in third world countries. 2) Design should not only serve healthy people, but also the disabled. 3) Design should seriously consider the use of limited resources on earth, and design should help protect the limited resources on the planet that we live in.

In 1955, for the severe social problems and the anti-humanization tendencies appeared in the planning and design in the west world, Team 10 of UIA (Union Internationale des Architectes) pointed it out that the starting point of urban design should focus on the care of people and society, and published *Doorn Declaration*, which proposed the people-centered idea of "human association". Its core is the contact between people and the environment. Facing the current problems existing in urban construction, people are making continuous reflections, and they have gradually and explicitly realized that the central goal of urban design is to satisfy people's requirement for living, survival and development. The humanization design is based on people's physiology, psychology and behavior, which should reflect the public life. People design the environment, and also live in and use the environment. Therefore, the environment where people are must be infiltrated with

humanization, so that people can have a sense of affinity and recognition in the environment, and alleviate the external pressure. Humanization starts from people, and finally affects people's cycle. Therefore, we must reflect people's nature in the design.

The city traffic square is an important location for the city residents to have social activities, and how to design a humanized square that is suitable for the residents' life is a core value that should be followed. The city traffic square should serve people and be based on people's comfort. When people are within the city traffic square, their tension will be gradually relaxed, and they will be integrated into the manmade natural small space and environment. Only by satisfying various requirements in people's life can the design of city traffic square attract and coordinate people's life, in this way to improve the value of square. The design of city traffic square should consider humanization factors, during the design process, not only people's psychological and behavior features should be studied, efforts should also be made to consider the group characteristics at various regions and climates as well as the feelings of groups of different age, gender and class, in this way to create diverse spatial feeling and great communication relation.

The humanized design of city traffic square is closely related to people's behavior and activity and the used transportation space. The transportation of square is to mainly handle the internal traffic of square and the boundary traffic problem, which is the relation between the square and the other functional spaces in surrounding cities. The proportion between the square and other main buildings in surrounding area and the size and length-width ratio are the important factors of the humanization of square. Since the beginning, the designers of city traffic square have been pursuing proper size to satisfy people's psychological requirement.

The functional layout of square should be consistent with people's life and activity habits. During the design of square, each kind of person should be considered. The square environment should not only be suitable for people of various ages and classes to conduct activity, but also make barrier-free design for the disabled, elderly and children.

(3) Proper sparseness of square space

If the density of personnel and vehicles on city traffic square is too high or too low, it does not benefit the behavior vitality of square. Density is closely related to crowdedness, and related representative theories include Milgram's "theory of sensory overload" and Friedman's theory of density-strength: a high density tends to cause crowdedness, which tends to make people feel agitated, nervous and anxious. In a certain environment, if there is too much information and people's mental burden is increased, people's behavior will be restricted, and their personal private space will be damaged, which will ultimately reduce the square's popular behavior vitality. On the opposite, in a certain environment, if the density is very low and the space utilization efficiency is low, the square is unpopular, and the square with intensified indifference, the square will lose its significance of existence. Only within proper spatial scope and reasonable crowd density can people experience physical and mental balance through the interpersonal relationship and community activity. The scope of city traffic square and the space composition affect people's psychological and behavior manner. The anthropologist Edward Hall studied different distance requirements during interpersonal relationship, i.e., the interpersonal distance, which reflects different psychological feelings of people during the exchange. Intimacy distance: (0~0.45) this is a distance that expresses strong feelings, such as tenderness, comfort, caress and excitement. Within this distance, people can clearly see each other's face and feel each other's smell and body temperature. Personal distance: (0.45~1.30m) it is the distance for close friends or family members to have conversation. Within this distance, the smell and subtle visual information is reduced, but the two parties have contact. Social distance: (1.30~3.75m) it is the distance for friends, acquaintances, neighbors and colleagues to have normal conversation. The rest space in square consisting of tables and chairs should present such social distance. Public distance (>3.75m): it is the distance used in one-way communication, such as assembly, speech or other discreet location when people prefer to watching without participation. People might not pay attention to this, but people will unconsciously follow these rules. Once these rules are damaged, people will feel uncomfortable.

The sense of security is people's natural requirement. In front of a stranger, people will subconsciously want to protect themselves and build a barrier for themselves, so that they will be in a safe location. In fact, all animals in nature have this instinct of protection and attack. From the perspective of psychological feelings, people who are on the city traffic square do not want it to be too wide or crowded. When people are looking for a place for rest, they prefer the location that they can lean on, such as next to the tree, flower bed and fence, rather than staying at some open place without anything to rely on, which reflects people's requirement for security and dependence. During the spatial design of city traffic square, only by further understanding people's physical and mental features can we effectively consider the distribution and flow of crowd on the square, in this way to build proper square spatial environment.

(4) Accessibility of city traffic square

The accessibility refers to the possibility and convenience for people to reach the city traffic square. The city traffic square full of activity can attract people to the square to have maximum contact with the nature to reach perfect contact, and the accessibility refers of city traffic square plays an important role in this process.

The accessibility includes two aspects: the vision accessibility and the route accessibility. 1) The vision accessibility refers to the physical information that human eyes can see and easily receive. On the square, the factors easy to observe are the center, fence and boundary of square, which can generate certain human-view interaction facilities and sketch elements. For example, if there is a big statute or there are many advertising light boxes at the center of square, it might block the vision of vehicle and pedestrian to check the traffic situation of farther location. Statute and advertising board with excessive decoration will not benefit the traffic safety, because they will attract people's vision and distract the attention of pedestrians and drivers. Based on comprehensive consideration of people's vision accessibility, the traffic congestion of city traffic square can be prevented from the perspective vision psychology. 2) The accessibility of traffic can reduce the phenomena of traffic congestion, which will make it easy for people to reach the destination. The successful city traffic square should be connected to the road on one side or two sides, and it should be connected to the outside through orderly roads, which is not only the extension of road, but also the transfer center between roads. The city traffic square should clear layout and specific spatial structure, so that people won't feel lost and lose their sense of direction on the square. The buildings around the square should be opened to the square, which should be equipped with the space for public access. In this way, the square will have better organizational traffic and the possibility for efficient use, and it can improve the vitality and energy of the squares. In order to prevent people on the square from blindingly crowding on the square and ensure that they could find a place for rest, some seats can be arranged. On the square, there are many facility elements that can be used to be closely related to people, and efforts should be made to adequately utilize the accessibility of square on various aspects and carry out the creativity and control during the planning process, so that people can feel free and comfortable.

(5) Distribution of right of way

At present, the shortage of land resources has become a new urban problem. Because the road only has limited land use resources, during the same period, if two transportation methods exist on the same road, it will definitely cause the traffic problem. Therefore, during planning of the city traffic square and its surrounding roads, the distribution rules for right of way should be adequately considered to plan the road, in this way to prevent unnecessary crowdedness and congestion and ensure the safety and orderliness of road traffic.

The distribution rules for right of way mainly include the following three aspects: 1) Pedestrians first: the groups passing through city roads can be basically divided into the two types of pedestrians and vehicle riders. Under limited road area, if one has to be chosen from these two types, the pedestrians' passage should be guaranteed first. 2) Bus first: the priority for bus can support public transportation on the one hand, and restrict the passage of small vehicles on the other hand. City buses have the characteristics of big traffic volume and multiple lines, and by adopting the

principle of focusing on buses while supplemented by other transportation methods, it can rapidly distribute the group, relieve the road pressure and effectively alleviate the city traffic congestions.

The spatial division of right of way mainly regulates the right of transportation participants to use the travel space, which can be generally divided into the rights of way for pedestrian, vehicle, motorbike, parking, railway and expressway driving. Based on the spatial division of right of way, the vehicles and pedestrians can be clear of their own passage space, so that they will use it correctly. For example, the sidewalk is exclusively used by the pedestrians, the motorway is used by motor vehicles, and the bus lane can only be used by buses. If the traffic participants to enter the unspecified space by violating the rules, it should be regarded as violating the right of way.

The time division of right of way mainly regulates the passing time of traffic participants. Generally speaking, the suspension logo, intersection signal and railway & road signals can be used to limit the right of way. Based on the time division of right of way, the traffic participants can safety and orderly pass the common public area in accordance with the specified sequence. For example, at the intersection, if the red light is on, vehicles at this phase are not allowed to pass the intersection; if the green light is on, vehicles at corresponding phase are allowed to pass the intersection. If the traffic participants enter the intersection by violating rule, it should also be regarded as violating the right of way.

3. Conclusion

With the social progress, the fast development of global economy and culture, global integration and the acceleration of urbanization, the cultures and values of various countries around the world are gradually becoming synchronous, and the city traffic square has become an indispensable space in people's life. How to develop the traffic square in China has become a common difficult problem facing the designers.

The traffic organization of traffic square should be analyzed in accordance with specific situation. Reasonable planning and design can make the traffic more orderly and travel more convenient. As a traffic joint in city transportation, the traffic of traffic square will affect the traffic flow on various roads, and reasonable organization of square traffic can reduce this impact to the minimum, so that it can coexist harmoniously with the surrounding traffic.

From the perspectives of close connection in layout and traffic smoothness of city traffic square in China, this paper makes initial exploration on how to jointly plan and design city traffic square. This is only a beginning for the research mentioned in this paper, and many problems require further discussion with the progress of urban development. Therefore, the author will continue to conduct detailed exploration and research during the future work and study.

References:

- [1]. Yu Quan, Yang Yongqin, Ren Futian, Analysis and Research of Right of Way in Transportation Project, Road, Traffic & Safety, 2006, Issue 2: p.12-13.
- [2]. Tang Hua, Brief Discussion of Modern City Square, Journal of Nanjing Architectural and Civil Engineering Institute, 1997, Issue 3: p.33-35.
- [3]. Lu Jun, Yan Yang, Li Mengbo, Sun Xiaolu, Brief Discussion of Modern City Square, Journal of Hebei Institute of Architectural Engineering, 2009, Issue 1: p. 27-28.
- [4]. Cui Zhiyu, Brief Discussion of the Method to Improve the Transportation of Station Square, China Science and Technology Review, 2010, Issue 6: p. 42-45.
- [5]. Shen Jinguo, Brief Discussion of the Method to Improve the Transportation of Station Square, Modern Science, 2008, Issue 10: p. 21-24.
- [6]. Zhang Geyan, Transportation Analysis and Reconstruction Suggestion for North Square of Beijing West Railway Station, Urban Public Utility, 2004, Issue 1: p. 37-39.
- [7]. Yan Jun, Development History of Chinese City Squares, Journal of Nanjing Forestry University (Humanity and Social Science Edition), 2004, Issue 1: p. 23-25.