Study on the Influence of Open Blocks and Closed Blocks and Urban Traffic Safety

Ze Yao REN, Yong Sheng QIAN

School of Architecture and Urban Planning, Lanzhou Jiaotong University, Lanzhou, Gansu 730070, China
Email: 1005246608@qq.com

Abstract: Urban transport problem has become one of the most important urban problems in the rapid development of urbanization. Urban traffic safety is one of the most important influencing factors of urban traffic problem. With the opening of the concept of opening blocks, this paper will be closed blocks and open neighborhoods to do a study and comparison, while the use of spatial syntax theory of Suzhou City, the urban road network density analysis, to find the open neighborhood as a dense road network development model for The city's traffic safety has a certain impact.

1. Introduction
With the accelerating process of urbanization, the scale of many cities in China has developed rapidly, but it has also caused many contradictions and problems. Urban traffic congestion, traffic chaos, and thus cause frequent traffic accidents, is one of the more prominent issues. At the same time the urban population, motor vehicle ownership and travel distance continues to increase, the rapid increase in urban traffic trips, urban traffic safety, smooth, living environment put forward greater challenges and higher requirements, the public for safe travel, green travel demand and willingness are more intense.

In February 2016 issued the "CPC Central Committee and State Council on the further strengthening of urban planning and construction of a number of opinions" in the proposed "new residential to promote the street system, in principle, no longer building a closed residential area, establish a narrow road, The road layout of the city concept, the construction of expressway, primary and secondary roads and tributaries of the rational road network system"[1]. The views will guide China's urban construction to a new direction, and narrow network as the core of the neighborhood planning concept will also become a hot topic under the new era. The urban planning thought of street system and closed community system originated from the different trajectory of social development in east and west and the demand of social activities.

2. Closed block with open neighborhood
The block system originated in the ancient Greek Miletus (Miletus), 440 BC, the philosopher Hippodamus (Hippodamus) proposed the theory of urban atom, and Milly planning for a number of evenly arranged 60 ~ 80 m blocks , The four sides of the building side of the building shop, set up a courtyard, the formation of the classic neighborhood model [2]. Closed community system is actually fit in the planning of ancient Chinese Li Fang system of thought, the Tang Dynasty is the heyday of the development of the system, Tang Changan City, east and west to 11, north and south to 14 streets, the city is divided into 108 Square, a Xiaoli Square about 500 m square [3].
China's urban construction to "city" as the center, its foundation is safety and ritual. However, with the development of urban economy, the importance of "city" is gradually reflected, and the travel barriers caused by Fangqianmen can't meet the needs of urban activities. As a result, after the Song Dynasty, the wall gradually disappeared, there was the front shop after the house along the street business, the street scale has also been reduced, for example, the old Beijing city alley street scale is about 80 m × 400 m, Fuzhou three six lane street scale About 100 m × 400 m, but the residential area still maintained a high wall compound closed mode.

2.1 Closed blocks
Closed blocks are enclosed by a fence or fence outside the area, and the access control system is set at the entrance to restrict the access of foreign personnel and vehicles. The district usually occupies more than ten hectares and is not crossed by the city road. Community of road systems, landscape systems and service facilities are relatively independent and complete, less contact with the city.

In recent years, in order to meet the needs of urban transport development, China's urban traffic road network spacing is generally around the meter, and at this stage of China's urban residential area is usually based on the urban road network structure planning range, so the city road network spacing China's urban residential area of land to the scope of urban traffic to the scope of the residential area of the scale of land are generally more than one hectare, the number of households in 2000-3000 households.

From the human cognitive environment and the ability to control the point of view, at this stage of China's residential area is obviously too large scale, Kerry Alexander pointed out that the scope of human cognitive neighborhood diameter should not exceed 300 yards, Within 5 hectares, Baozan Barker also believes that a good neighborhood space should be within 150m, or an area of 0.04km2. Excessive living scale will only increase the stranger between neighborhoods, increase the waste of urban land use. Through the investigation and study, most people can accept the best suitable distance between 400-500m [3], the distance from the nearest bus station should not exceed 5 minutes walking distance, and according to China's large city residents within a short distance travel options The relationship between the mode and the travel distance is shown in Table 1 (1), and the pattern of daily commuter traffic in different land use modes. In Table 2, we can judge that excessive living space leads to land use to low density, Extensive development, while increasing the distance traveled at the same time, increase the urban residents of the car that is dependent on the car.

Table 1. China's large city residents short distance travel rate of assessment and travel distance relationship

| Distance range (km) | Walk | Bicycle | Bus | Car | Other | Total |
|---------------------|------|---------|-----|-----|-------|-------|
| 0-1                 | 73%  | 22%     | 0%  | 1%  | 3%    | 100%  |
| 1-2                 | 36%  | 45%     | 5%  | 8%  | 6%    | 100%  |
| 2-3                 | 12%  | 44%     | 20% | 17% | 7%    | 100%  |
| 3-4                 | 4%   | 35%     | 32% | 22% | 6%    | 100%  |
| 4-5                 | 0%   | 35%     | 26% | 31% | 7%    | 100%  |
Table 2. Urban daily commuter traffic patterns under different land use patterns

| City      | State | Land use pattern       | Walking with bikes | Motorcycle | Public transit | Private car | Other |
|-----------|-------|------------------------|--------------------|------------|----------------|-------------|-------|
| Mosley    | America | Low density dispersion | 1.4%               | 0.9%       | 3.9%           | 92.2%      | 1.6%  |
| London    | Europe | Between the two        | 11.5%              | 1.9%       | 17.0%          | 70.6%      | -     |
| Hong Kong | Asia  | High density integrated type | 2.9%               | 3.8%       | 84.8%          | 6.3%       | 2.2%  |

Closed residential area (closed neighborhood) features the following main features:

① In the residential area of the border with a wall, or a fence structure, so that residential area and the surrounding area of the isolation.

② In the district boundary set a very limited number of entrances and exits, usually two.

③ The main road within the district is generally only two directions, respectively, leading to the district entrance and external roads connected.

④ Import and export of the district generally set up security agencies or electronic monitoring equipment control personnel and vehicles access.

⑤ Residential road organization and the external road structure of the isolation, the district within the road through the poor, generally do not allow non-residential vehicle traffic area.

2.2 open blocks
The concept of open neighborhoods is proposed by the French architect Chris CENTer Bauschant Bach in his theory of urban age, whose basic concept is the area surrounded by streets in the city, which is smaller than the residential area and is reserved for urban residents. Open neighborhoods can realize the sharing of urban public resources, and the organic integration of urban functional space, to create a vibrant urban atmosphere and improve the urban functions of residential areas.

In 1941, the British transportation scholar Qu Pu proposed the classification of urban road traffic, and suggested that certain measures should be taken to control the traffic flow and restrictions, so as to protect the safety of pedestrians and cyclists to protect the specific areas such as living from motor vehicles Impact. Qu Pu also put forward the concept of "urban functional blocks", emphasizing the importance of block construction, advocating the city's secondary roads and branches to define the plots, each building or residential are as close as possible to the slip road system. The formation of the corridor street restrictions on the entry of cars, to encourage walking and leisure activities such as the occurrence of life. Qu Pu is known as the first person in the neighborhood development planning, but also the development and construction of road grid has an important contribution to the people.

(1) The characteristics of the open neighborhood include the following four points:

① Building space surrounded by the existence of independent, with good ventilation and lighting.

② Independent monomer is conducive to the establishment of a variety of rich personality of the settlements.

③ Do not reunify the height of the building, emphasizing the changes in the construction skyline, to avoid the building "wall effect" appears.

④ With the classical city of the same monotonous style is different from the open neighborhood hope that the city is full of heterogeneity, confusion and contradictions. This idea is reflected in the urban neighborhood is to make full use of the diversity and possibilities of urban blocks. For example, the smaller the city block, the more dense the road network, the better the accessibility of urban traffic, the more routes you can reach.
3. The impact of closed and open neighborhoods on urban traffic

In the absence of effective government control and control of urban transport, the new road facilities will induce new traffic, and traffic demand tends to exceed the traffic supply. So widen the road, but also can not solve the problem of traffic congestion.

City, such as the human body, the human body accounts for more than the total amount of blood vessels capillaries. If the capillaries are blocked, not only will cause congestion, but also make the body's nutrients can not be transported to various organs. We can not by expanding the aorta and vein way to replace the huge number of capillaries, the city is also the case. A large number of closed residential areas such as the bulk of the human body necrosis, a large number of clogged capillaries, should be filled with nutrients gradually lose vitality, if not cause attention, the body will be paralyzed or even death. Similarly, the city will eventually because of traffic congestion, environmental pollution, street vitality and eventually overwhelmed to decline. Semi-open residential area is to deal with this series of urban ills of the medicine, the Asia-Pacific region of South Korea, Singapore, Japan and other countries of the successful experience is that this point, these experiences on China's current residential area construction should play a very good reference The more fine road network.

3.1 The Impact of Closed Blocks on Urban Traffic

Compared with the traditional residential area, closed communities because of the surrounding boundaries (usually green belt and iron fence, etc.) and the surrounding road network strictly separated, and the community within the nature of land and traffic characteristics similar, it can be regarded as a relatively independent Traffic district to carry out research [4]. Closed community is an independent source of tourists and attracts, but for transit traffic has a very obvious shielding effect, because the closed community only allows the community to enter and travel vehicles, and other social vehicles shut out. So the traffic flow line of the closed community is significantly different from that of the traditional residential area. In terms of the time distribution of traffic volume, the traditional residential area has a large number of traffic between the neighborhoods in addition to the commuting traffic to and from commuting. Therefore, the difference in traffic between the peak and the peak in the residential area is not And most of the closed communities use underground garage, so that the residents within the community are very few links between each other, so the traffic occurred in time with a clear concentration characteristics, a large number of traffic concentrated in the morning and evening rush hour [5].

3.2. The impact of open neighborhood on urban traffic

In the city, the more dense road network the better, this is a consensus. A two-way eight-lane traffic capacity, as two two-way four-lane road, because the traffic capacity of the road although almost, but the intersection of the situation is very different, a single must be blocked by the intersection, the possibility of much more than a few Optional intersection. More dense road network gives more travel routes to choose. Moreover, after years of concentrated construction, the current Chinese cities are not lacking a large trunk road, the lack of further ease the decentralized secondary road, as from the aorta of the huge blood flow suddenly to the narrow barrier of the capillary , Congestion thrombosis from this.

(1) Open block construction will increase road capacity

Western urban transport in developed countries has experienced the development of suburbanization, the road area rates of these cities are very high, such as Washington urban road area up to 43%; Japan and the United States urban road network density of 15 km / km2 or more The

High road network density can be formed into a continuous walk with the motor vehicle shunt system; for the use of modern traffic control and management means to create good facilities conditions; is conducive to the diversion of road traffic pressure, the traffic flow distribution in the entire road network; Is conducive to the layout of bus lines to improve the coverage of public transport; for the secondary road in the vehicle off-peak hours to allow roadside parking to create conditions and
other advantages. The space range of the open neighborhood will form a small road network spacing, road network density and road area rate and other traffic capacity will increase.

Through the construction of open blocks will be the current wide and dilute network layout model gradually adjusted to narrow and dense road network layout model, improve the urban road capacity to meet the ever-increasing urbanization, motorized level of urban traffic needs, while can provide a more complete road transport facilities, urban road traffic diversion and other measures to make the city people travel more secure.

(2) The construction of open blocks makes the road network level gradation more reasonable

The road network must be an organically coordinated system with a reasonable level gradation. Road traffic flow from the lower level of a high-level road to an orderly collection, and by a high-level road to a low-level road orderly evacuation. Overall, foreign urban indicators are roughly at the same level, trunk road network accounted for about 20% of the total length of the road length of 80% of the total length. Some cities in the current status of the trunk road density of 1.4-2.5 km/km² accounting for 40% of the total length of 60%.

Open road system generally presents a small scale, open, high density, network-like features, road types and diverse, clear road network, residential neighborhood network and the existing urban road network has a good convergence, smooth traffic. So that the residential roads and urban roads for good convergence, to avoid the reasons for residential roads, resulting in poor urban road traffic and traffic accidents.

(3) The introduction of urban public transport

Internal road public, the city public transport into the residential area, the introduction of the city branch of the nature of the municipal road, the relatively large size of the residential area is divided into small neighborhoods. In the residential area within the establishment of the city branch of the nature of the municipal road, bus station settings and residential public center with each other. The establishment of public transport facilities, improve the coverage rate of public transport sites, increase the safety and convenience of public transport, increase the proportion of residents traveling by public transport, reduce the proportion of private cars in the traffic structure, effectively relieve traffic pressure and form sustainable Traffic patterns to improve the safety of people traveling for high-speed vehicles to provide a safe driving environment, while supporting the city center and the center of the compact, high density land development model.

3.3 Advantages of open neighborhoods:

(1) Traffic efficiency

Open blocks compared to closed blocks, the traffic service is more efficient. The reachability of the open block mode is significantly better than that of closed blocks. The internal roads of the closed neighborhoods are designed and closed to management, although the internal traffic is made more secure, but the continuity of the urban road network is affected, and the traffic volume is concentrated, thus causing congestion and traffic accidents. Too many closed residential areas, schools, organs and units of the road to break the accessibility of the road. Over the years the traffic planning community has been advocating to increase the density of tributaries to ease the congestion, that is, to correct the closure of the block, the respect of open neighborhoods. Open neighborhood narrow path form is more conducive to efficient organization of traffic:

① Small road spacing can be organized in the case of a single road, thereby reducing the intersection point, to improve the intersection capacity. Closed blocks can not organize a single line of traffic, a single line will lead to bus transfer and car bypass distance is too large, resulting in residents travel inconvenience.

② Dense road network bus lines, you can disperse the trunk line repetition coefficient, increase the bus line coverage, reduce the bus station to the destination walking distance.
Road traffic and bus lines have been cleared, the bus station can be set near the intersection to facilitate passengers crossing the street. The bus line can also be organized according to the secret road network, the transfer distance is recommended to control within 150 m, reduce the adverse effects of transfer.

(2) Safety and management

Intuitively understand that closed neighborhoods are safer, more quiet and quiet than open neighborhoods. However, it is questionable whether closed communities are truly safe. Jane Jacobs criticized the closed community to make the residents back to the streets, metal fence will not be more effective than the "street eye".

In order to balance the activities of people and cars, pedestrians (especially children) can be on the road to move, to limit the speed and limit the parking policy, to achieve people and cars to share the street space [6]. Therefore, the problem of car conflict in the neighborhood city can also be treated, not inferior to the closed neighborhood. It is undeniable that the management level of the closed neighborhood is considered to be better than the neighborhood city, and the internal traffic is more secure, the accident rate is lower. However, the environment of closed neighborhoods depends on property management. When the level of property management falls, its safety and tranquility will decrease accordingly.

From the above study, we find that the urban traffic in the closed block mode shows the pattern of wide road and road network, which can be called "big street". The urban traffic in the open block mode shows a narrow road and dense road network Model, called "small neighborhood".

4. Based on spatial syntax analysis of urban neighborhoods and urban traffic safety

4.1 Research methods

4.1.1 Spatial syntax concept

Spatial syntax is a kind of theory and method of studying the relationship between space organization and human society through the quantitative description of human space structure including settlement, architecture and city. It is also a new theory based on graph theory and GIS. A computer language that describes the characteristics of urban spatial structure [7].

The space in the spatial syntax is not an object that can be measured by the mathematical method of Euclidean geometry, but rather a relationship represented by topological relations. Spatial syntax is also concerned with the actual distance between spatial objectives, but its accessibility and relevance [8]. Its basic principle is spatial division. According to the free space of geographical things, spatial segmentation is divided into three basic methods: axis analysis, convex polygon method, and segmentation method [13]. In general, axis analysis is used to divide urban space.

4.1.2 spatial syntax main variables

(1) Integration

The integration reflects the aggregation or discretization of a unit space with all other spaces in the system. When a spatial system is integrated or agglomerated, all the unit spaces in the system are closer, and there are few obstacles between them that affect their association, that is, the links in the small blocks (open neighborhoods) But the system space is far apart, there are more obstacles between them affect their relationship, in the neighborhood (closed block) in the distance between the unit space, the contact is not close [9]. The global integration can reflect the centrality of a certain space relative to other urban spaces. Local integration can be used to analyze the spatial distribution of pedestrian traffic. The spatial syntax represents the integration value of the spatial unit by color grading.

(2) Depth value

The depth value refers to the minimum number of connections required for unit space to other space in a spatial system. The depth value is not a fixed amount, but with the observer in the city of
different views, the line of sight from near and far, step distance from small to large, the depth value will be changed. The smaller the depth value, the higher the convenience of the space, in the small blocks (open neighborhood), the convenience of the block area than the neighborhood (closed neighborhood) more convenient.

4.2 The Influence of Suzhou District Space on Urban Traffic Safety

Application of UCL (University of London Institute of Space Technology Analysis Center) developed the spatial analysis model - based on Arcview3.2 expansion module Axsiwoman3.0 (in the current urban space research and application has been more mature), through the Suzhou City, Suzhou City at different times (The spatial data of the urban space) is the present situation of the urban planning in 1995 and the urban spatial remote sensing image of Suzhou in 2004. Based on the principle of axis map construction, the spatial data of urban spatial data are selected to ensure the spatial sociality of the axis data and scientific).

Figure 1. Suzhou city space integration analysis chart

Figure 1 (a), (b) represents the spatial frame of the two periods, and the darkened axis represents the global integrated neural network. In view of the total number of axle map data and the size of the city in 1995, the integrated nuclear axis ratio takes the total axis 17% (60), the integration range of 0.04870-0.04920. Taking into account the 2004 scale of the city and the complexity of the axis map, integrated nuclear axis to take the total number of 10% (78), the integration range of 0.86312-1.06299. At the same time, the darker the color, the smaller the depth of the space on behalf of the region.

Through Figure 1, we find that the greater the density of urban road network, the higher the degree of integration of urban space, that is, the distance between the small space in the city closer, more closely linked, the smaller the depth of space, the region's degree of convenience is higher; on the contrary, the greater density of the road network, the integration of urban space is reduced, the relationship between the space decreases, the greater the depth of space, the lower the convenience of
the region. Compared with the spatial and temporal spatial patterns of 1995 and 2004, it is found that with the expansion of urban space, the road network in the city center is gradually intensive, while the external expansion part of its road network is more sparse, in the development trend, the city center with the road network density, The spatial integration is gradually increased, the depth value becomes smaller and the spatial range becomes larger, and the area of the newly expanded area is lower than that of the central area because of the low density of the road network.

According to the neighborhood concept proposed in the preceding paragraph, we can see that the open neighborhood is a small street in the dense road network, and the closed neighborhood is the main street of the road network. It is concluded that the urban space of the road network has its low integration and depth The urban space is not convenient enough; and the city network of dense road network, its high degree of integration, the depth of the small, close contact with urban space, traffic is more convenient, that is, small blocks of open neighborhood model is more suitable for urban space development of.

The small space model provides more planning and management opportunities for urban traffic, such as the diversion of urban roads, the optimization of urban public transport, and the improvement of urban transport facilities, resulting in a more secure travel environment for pedestrians and drivers.

5. Conclusion

China's current "urban road traffic planning and design specifications" in the provisions of China's urban road network density 3-4km / km², but the actual planning implementation is far less than this value. According to the national standard should present a pyramid-type road network, but showing a pyramid or spindle-type road network. The main problem of urban road in our country is the construction of expressway and main road network at the same time, ignoring the construction of urban roads and slip road network, resulting in urban road network function gradation imbalance, so many roads assume the function of the slip road, Which in turn affects the traffic function of the main roads, but also affects the traffic safety problems on the urban roads: too many cars, too many pedestrians, traffic facilities are not perfect, more prone to traffic accidents, and after the accident Rescue measures are relatively slow, resulting in greater impact.

Closed blocks and open blocks are not intended to take only one of the modes for construction and development, but to be able to combine the two, for a city, in the existing closed block mode, to find a reasonable Way to open the neighborhood, will open the concept of integration into the neighborhood which is necessary to plan the relevant staff and traffic management personnel to work together to complete the area. Although the current social situation, due to the management of specialized personnel, closed-block mode of traffic more secure, but with the development of society, from the social interaction and integration of the development point of view, the neighborhood environment to learn to respect others Privacy, not loud noise, to comply with public order, so as to promote the integration of different people, mutual respect, the city has gradually become civilized, people's quality improvement, urban traffic management and planning more perfect, open neighborhood model is the future social development the trend of.

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