ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

Study on the relationship between the construction of community slow walking system and residents' activity range

Zequn Li[1,a,*], Hui Wang[1,b]

[1]School of Architecture and Arts, University of Northern Technology, Beijing, China
[a]2263880912@qq.com, [b]likun_04@163.com
[*]Corresponding author

Abstract: *With the acceleration of the urbanization process, the number of residents' motor vehicles is increasing, which seriously affects the construction environment of community slow driving system and the living environment of community residents. Building community slow traffic system and improving the traffic environment of slow traffic system have become an effective way to realize green travel. Based on the current situation of road traffic development of community slow traffic system, this paper studies and analyzes related cases of community slow traffic system construction at home and abroad, analyzes the advantages and disadvantages of the application of community slow traffic system construction from the aspect of urban planning and further optimizes it. On the basis of the network planning of the existing community slow travel system, it is suggested that the community slow travel system should be constructed in a short distance, under the condition of ensuring traffic safety and smooth road, and integrating the community slow travel system with the regional cultural characteristics of Shijingshan District of Beijing. This article mainly summarizes the experience and lessons from the case analysis of the construction of community slow walking system at home and abroad, and finds the planning measures that conform to the construction of slow walking system in Shijingshan District of Beijing. Reasonable use of the existing road traffic network of the community slow traffic system, and combined with the actual needs of the community residents to rectify the road of the community slow traffic system, to achieve the rational connection of different types of community slow traffic system. The evaluation index system of community slow traffic system construction is established from the perspective of comfort and efficiency, which provides theoretical basis for the planning of community slow traffic system construction.*

Keywords: *Slow running system; Community slow travel system; Build; The range of activities of residents; relation*

1. Relevant theories and research status

1.1. Relevant theories

(1) Definition of the slow running system.

Slow traffic system is the general name of slow traffic, surrounding landscape and local city cultural heritage. The slow travel system takes walking, bicycle, public transportation and other slow travel modes as the main body of urban traffic, effectively solves the problems of fast and slow traffic conflicts and the difficulties of slow traffic subjects, and guides residents to adopt "walking + bus", "bicycle + bus" and other travel modes [1].

(2) Definition of slow traffic.

In a broad sense, slow traffic mainly refers to walking, non-motor vehicles, etc., and takes a short-distance, low-carbon, environmentally friendly sustainable travel mode.

In the narrow sense, slow traffic mainly refers to the traffic planning and construction based on walking and cycling. A safe and comfortable traffic environment is established by integrating the slow traffic with the surrounding natural landscape and architectural pieces, and the slow traffic system is established.

In practical application, in addition to its own traffic characteristics, the slow traffic system also

ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

provides people with places for rest, entertainment and shopping, which is convenient for the protection and display of urban cultural heritage [2].

(3) Slow traffic system requirements.

Slow traffic is composed of walking and non-motor vehicles. Slow traffic system needs to meet traffic and non-traffic needs in urban traffic. The traffic demand requires that the slow driving system has a certain traffic carrying capacity while satisfying the safety of personnel, and there are specific roads to meet the non-motor vehicles and walking channels. Non-traffic is the nature of leisure, tourism and fitness of the system. The slow traffic system proposes to give priority to walking and cycling roads in urban leisure areas, residential areas, theme parks and scenic spots to meet non-traffic needs. The traffic and non-traffic characteristics of the slow traffic system, on the one hand, to provide convenience for people to travel; On the other hand, it requires continuous attraction to attract the participation of individuals. Therefore, slow travel can be combined with tourism and business, on the one hand to improve the attention of slow travel; On the other hand, the use of tourism and commerce to obtain economic benefits for the operation and maintenance of the slow traffic system continues to broaden the slow traffic area, and finally forms the development of the slow traffic network [3].

(4) Slow traffic design elements.

The design of slow traffic system should consider the difference of individual behavioral needs of participants, analyze the interaction of various elements, and consider the characteristics of spatial organization on the basis of each element. Finally, the feedback of the systematic evaluation index system on the main content is obtained [4].

2. Spatial function and requirement analysis of community slow travel system

2.1. Spatial function analysis of community slow travel system

Generally speaking, the comfortable walking time of urban residents is mostly between 5 and 10min, and the walking distance is about 600 to 800m. The walking time is within 30min and the walking distance is about 2200m, such as shopping walking time 0 ~ 25min and commuting walking time within 30min. The comfortable travel time of 90% of the slow walkers who use bicycles is about 10 ~ 20min, the comfortable distance is 2000 ~ 2500m, and the riding time can withstand 30min or less, and the distance is about 5000m. Therefore, it is necessary to build a comfortable slow driving environment, control the scale of the urban road network, and rationally arrange functional partitions to facilitate the activities of slow walkers in the slow driving system [5].

The functions of slow travel are mainly divided into slow commuting, slow learning, slow connecting to public transport, life service slow travel, fitness recreation slow travel.

2.2. Spatial requirement analysis of community slow traffic system

According to Maslow's demand theory, people's health needs are mainly characterized by psychological needs, behavioral needs and physiological needs, which results in the allocation of high-quality and easily accessible public Spaces such as green Spaces, amusement parks and parks. Easy access to convenient commercial outlets and parking space configuration; The demand of slow space such as convenient public transportation transfer and orderly walking environment.

3. Community slow system construction

The community slow traffic system needs to match the urban slow traffic system and the 15-minute community life circle. The community slow traffic system is composed of slow traffic area, slow traffic corridor and slow traffic node.

3.1. Construction of community slow walking area

The main purpose of dividing slow traffic area is to connect with the development of urban slow traffic area and reflect the structure and function of community life circle. According to the size and function of the area, it can be divided into slow traffic unit, slow traffic group and slow traffic area from small to large.

ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

(1) Slow driving unit:

The daily walking activities of community residents have a certain range. The slow walking unit revolves around the activity space of the travel center and the public center, which can complete the most basic neighborhood communication and rest functions. Slow driving unit is the basic unit of the community slow driving system, which is divided according to the block unit, usually 100 ~ 200m, with walking as the main way of slow driving, providing the most basic function of the community slow driving system.

(2) Slow Group:

Slow walking group through the walking comfort range of 600 ~ 800m, with several slow walking units as a slow walking group, with the five-minute life circle. According to the classification of urban functions, the community slow travel group mainly carries the functions of living, leisure and public service. Walking and bicycle are the main modes of slow travel within the group, and the traffic activities outside the group are connected by other transfer means.

(3) Slow driving area:

The urban slow travel zone is divided according to the comfort range of bicycles of 2 ~ 2.5km, which is matched with the 15-minute life circle. It takes the natural boundary of the city and the urban trunk road as the boundary, and the slow traffic mode is mainly bicycle and bus (figure 1).

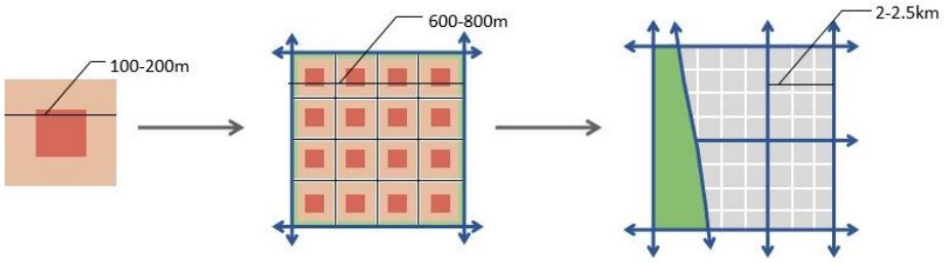

Figure 1: Slow running system area diagram (self-drawn)

3.2. Construction of community slow corridor

As the main traffic space of the city, the slow corridor plays an important role in connecting the city and radiating various urban groups. The function of the slow corridor is not only traffic guidance, but sometimes it can be used as the cultural narration and landscape sequence of the city. The level of the slow corridor is upgraded with the change of the level of the slow corridor, which can be divided into the slow corridor, the slow corridor and the slow corridor.

(1) Slow track: Slow lane is a corridor connecting slow lane. As a slow lane for residents' daily travel.

(2) Slow Group Road: The slow lane is the connecting channel between the slow lane. According to the traffic space of the city and the function type of the group, the corridor with different attributes is divided. The spatial form of this kind of corridor is free and flexible, which can not only continue the cultural elements of the city into the group, but also combine with the urban public transportation system to transform the slow traffic system, but also form a completely slow urban slow traffic channel.

(3) Slow lane: The slow zone road relies on the main traffic of the city and is the connecting channel of the urban landscape, tourism and cultural area. Show the city's humanistic characteristics and natural landscape characteristics, combine the city's tourism, ecology, regional culture and other urban landscape functions, and create ecological, healthy and humanistic urban characteristics of the slow lane. It mainly uses walking and non-motor vehicles as transportation modes to produce a comfortable and experiential slow-walking corridor that can stay.

3.3. Community slow node construction

The slow node mainly includes four different functions: unit activity space, group communication space, rest space and service space (figure 2).

ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

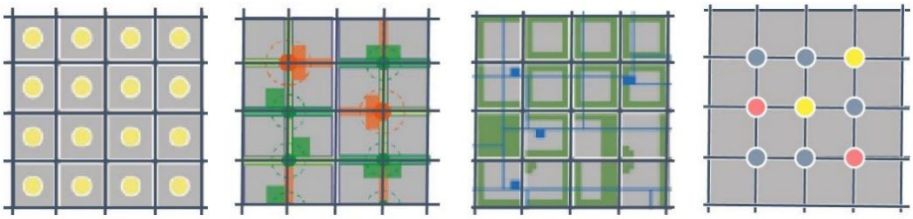

Figure 2: Slow running system node diagram (self-drawn)

(1) Unit activity space:

Unit activity space is the most basic living place of urban residents, and residents' daily activities are carried out around the unit activity space. Unit activity space not only provides residents with slow traffic function, but also provides residents with places for public activities.

(2) Group communication space:

Group interaction space is a space for diverse interaction activities among groups. The shaping of node space should pay attention to residents' activity behaviors and interaction. In the construction of communication space, attention should be paid to the distinction between privacy and openness.

(3) Leisure space:

The rest space should be arranged between 400 and 600m according to the comfortable walking distance. According to the layout of the building space, through private, semi-private and open space, the rest space is divided into a variety of different functions, suitable for all types of slow walkers, and separated from the surrounding space by the boundary, so that urban residents can enjoy a quiet and leisurely slow life.

(4) Service space:

The service space should be combined with the main functions of the group, and the function of the slow service should be set within a certain range of the group, so as to increase the dependence of the slow walkers on the space and the activity frequency. In the slow walking group, the slow walkers use the street space for slow walking activities, and the higher the integrity of the slow walking facilities and public service facilities on the street, the higher the comfort of the street for pedestrians.

To sum up, through the diversified functional design of the community slow walking network, the community residents are actively guided to experience rich and diverse community slow walking activity Spaces in the community, provide diversified places to facilitate people's communication and interaction, and optimize the urban living environment.

4. Optimization strategy of community slow traffic system

4.1. Build community slow traffic microcirculation

Under the influence of the advocacy of green, healthy and low-carbon travel, in collaboration with the construction of a 15-minute community life circle, through the construction of a community slow traffic network, the community life facilities with high use such as schools, commerce, culture, sports, health, and elderly care are strung together into chains to meet People's Daily public activities such as daily leisure walking, running, fitness, and commercial leisure activities within the community. Form a daily public community activity network to provide convenience for community residents to travel to the greatest extent, gradually build and optimize the community slow traffic network, and shorten the travel distance and travel time of community residents to the destination.

4.2. Improve the level of public bicycle service

Under the influence of the advocacy of green, healthy and low-carbon travel, the demand for slow travel is increasing, and we should seize this valuable opportunity to improve the service level of public bicycles, and try our best to retain the demand for slow travel transferred from private cars and taxis, focusing on the following two aspects:

(1) Expand the service scope of public bicycles. On the existing basis, it is necessary to increase the

ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

public bicycle service outlets outside the main urban areas, especially the peripheral urban functional areas such as residential areas, commercial areas and industrial areas, which are closely connected with the commuter transportation chain, greatly improve the coverage of public bicycles in the urban built-up areas, and provide facilities for residents to travel slowly under the influence of the advocacy of green, healthy and low-carbon travel. Thus, the demand for slow travel transferred from private cars and taxis is retained.

(2) Increase the free riding time of public bicycles. As the slow travel demand from private cars and taxis is often more sensitive to price factors, appropriately increasing the free riding time of public bicycles can consolidate the travel demand of these community residents on the one hand, on the basis of coordinating with perfect service outlets. On the other hand, it can also increase the travel distance and travel time of community residents using public bicycles.

4.3. Optimize the pedestrian traffic space environment

Since the fitness function of walking is more prominent under the influence of green, healthy and low-carbon travel advocacy, optimizing the walking space environment is particularly important to meet the demand for high-quality walking transportation, focusing on the following two aspects:

(1) Improve the accessibility of walking space. On the basis of the existing walking network, it is necessary to focus on improving the connection between residential areas, commercial areas and high-quality walking networks such as riverside walk, park walk and historic district, improve the utilization rate of high-quality walking space, and give play to the characteristics of walking system in fitness function.

(2) Appropriately enhance the spatial scale of the walkway. In some walkways with more concentrated walking demand, such as walkways in commercial areas and park walkways around residential areas, the walking space should be appropriately expanded and the spatial density of walkways increased on the basis of not affecting the overall environment, so as to meet the needs of community residents for slow travel, increase the comfort level of walking, and attract more residents to choose slow travel.

4.4. Improve the urban and rural greenway network

Greenway network is the skeleton and extension of urban slow traffic system, and also the link between urban slow traffic system and township and rural slow traffic system. Improving the urban and rural greenway network is a necessary move under the advocacy of green, healthy and low-carbon travel.

(1) Build a skeleton network of bicycle lanes. Improve the bicycle lanes between the main urban area and neighboring towns, and build bicycle expressways when necessary to form a bicycle skeleton network with the main urban area as the center and radiating the surrounding major towns and cities, provide high-quality bicycle traffic environment, and undertake part of the commuter traffic between the main urban area and neighboring towns and cities.

(2) Improve the coverage of urban and rural greenway networks. On the basis of the bicycle path skeleton network, the greenway network will be extended to further towns, scenic spots and rural areas, forming a complete urban and rural greenway network system, providing a better space for commuting, fitness and leisure.

5. Conclusion

As an important part of urban traffic, the slow traffic system connects the urban public comprehensive transportation system. Combined with domestic and foreign construction experience, on the basis of the existing slow traffic system that has been built and put into use, the system is optimized from the aspects of planning, design and management, and the conclusions obtained from the research are summarized in the following three aspects.

(1) The slow traffic system should be developed in a short distance and give priority to the development of crowded areas such as urban leisure areas, commercial areas and waterfront areas. Under the condition of ensuring traffic safety and smooth road, it can meet people's leisure and entertainment needs. In addition, according to the cultural characteristics of the region, it can establish

ISSN 2663-1563 Vol. 6, Issue 3: 36-41, DOI: 10.25236/AJAGE.2024.060307

a characteristic slow driving environment to make the slow driving system more comfortable and pleasant.

(2) Road space can adopt three-dimensional traffic system design, adopt three-dimensional traffic development, and traffic flow organization. The ground space can meet the requirements of slow walking activities, and the underground or shelving layer can meet the requirements of traffic travel. At the same time, different types of traffic connections should be considered in combination with the tourist routes, and the purpose of people's travel should be considered.

(3) According to the characteristics of the slow traffic system, the evaluation index system of slow traffic is proposed, and the system weight evaluation is carried out from the four perspectives of system support, comfort, fairness and efficiency, which provides an important consideration basis for the design and development of urban slow traffic system.

References

[1] Li Pengcheng, Shen Tianyi, He Qianhui. Study on Adaptive Community slow walking system under public health events [C]// China Society of Urban Planning, Chengdu Municipal People's Government. Spatial Governance for High-quality Development—Proceedings of the 2021 China Urban Planning Annual Conference (06 Urban Transportation Planning). China building industry press, 2021:216-228. The DOI: 10.26914 / Arthur c. nkihy. 2021.037345.

[2] Huang M. Preliminary study on urban greenway network planning based on urban slow travel system -- Taking Sanming City Greenway network planning as an example [J]. Shaanxi Forestry Science and Technology, 2017(03):56-60.

[3] Cao Jing, Yao Rui. Research on the construction standard of green road slow driving system under different classification systems [J]. Guangdong Garden Architecture, 2012, 34(03):15-19.

[4] Xiong Wen, Chen Xiaohong. Comparison and enlightenment of urban traffic patterns [J]. City Planning Review, 2009(3):56-66.

[5] Wan Jun, Zhang Hang. Research on urban slow traffic development model based on low-carbon concept [J]. Western Transportation Science and Technology, 2010(7):75-79.