

The Significance of Constructing Urban "Pocket Park" under the Concept of Sponge City--Taking the Greening and Leisure Square of Shanghai Lingang Home Community as an Example

Jiang Mengjie

China University of Geosciences, Wuhan, China

Keywords: Sponge City, Pocket Park, Meaning

Abstract: Due to the rapid development of the city, a series of environmental problems have arisen in the city. In order to comply with the national policy of building ecological civilization, more and more cities have implemented plans for the construction of sponge cities. Through the construction of sponge cities, cities will be strengthened to cope with natural disasters. And it can create one more suitable for people living in the urban environment. The characteristics of "pocket park" is small and convenient, which has become an important part of urban green space. This paper explains the construction of pocket park under the concept of sponge city through a brief introduction to sponge city and pocket park.

1. Introduction

In recent years, urban air pollution and natural disasters have become increasingly prominent, the urgent need to change the huge resources and energy consumption. The Third Plenary Session of the 18th Central Committee of the Communist Party of China has made overall design and systematic arrangements for the construction of ecological civilization. These requirements should be integrated into urbanization to promote resource conservation and environmentally friendly urbanization. In 2013, General Secretary Xi Jinping spoke at the Central Urbanization Working Conference and talked about building a "sponge city" for natural accumulation, natural penetration and natural purification. In 2014, the "Building Sponge Homeland" was again emphasized. In the same year, the Ministry of Housing and Urban-Rural Development compiled the Technical Guide for Sponge City Construction, which was officially released in October 2014 to determine the concept of "sponge city". In view of this, based on the concept of "sponge city", on the basis of the construction of pocket parks in urban areas, the construction of urban sponges and the construction of pocket parks are organically combined. Improve the quality of urban greening and create a pleasant living environment.

2. Sponge City and Pocket Park

"Sponge city" is a new urban construction concept based on traditional urban drainage system and urban development needs. It changes the traditional way of mainly using gray infrastructure, and improves the overall environment of the city by making comprehensive use of urban buildings, green Spaces, water bodies and other facilities.

"Sponge city" describes the city's flexible function of automatically adjusting water resources. Pocket park refers to a small space, such as a variety of small green Spaces in the city, small parks, street gardens and small sports venues. The small scale of pocket park and its close connection with life have become a good supplement to the urban park and solved the urban greening problem to a large extent.

The combination of sponge city and pocket park is to build the green space that can be seen everywhere in the city into a small "green sponge", and make the green space into a park to serve the public and at the same time have the characteristics of "sponge" to help alleviate the city's environmental problems. The decentralization of "Pocket Park" makes it flexible enough to be dispersed in the whole urban space. In addition, as a small public space, "pocket park" brings

people a space to rest in a timely manner in the fast-paced city life. It is widely distributed, improves citizens' participation, facilitates citizens to carry out various outdoor activities, and satisfies citizens' desire for park environment to the greatest extent. "Pocket park" can meet the needs of citizens according to the different functions of different geographical locations and assist the improvement of urban functional facilities. Turning pocket park into a small "sponge body" can be used as the hub of sponge city construction, connecting various large rainwater pipes to form a complete drainage network, so as to achieve efficient drainage and storage functions.

3. The Greening and Leisure Square of Shanghai Lingang Home Community

Lingang home service station and green leisure plaza are located at No.120, Lane 555, Guzong Road, Lingang (Fig. 1). The green area of Lingang Home Service Station and Greening Leisure Plaza is 1.30 hectares, accounting for 66% of the total area. As a concentrated greening, in addition to the 158 cubic meters of rainwater runoff in the local block, there is a margin of 190 cubic meters.



Fig. 1 Location and aerial view of Lingang Home Service Station and Green Leisure Plaza

Before the renovation, it was the residential area of the Lingang Homestead and the office area of the property company. However, there were frequent rain leaks in the rainy days, and the parking area outside the square was small. It could not meet the parking demand of residents and the original design of the green leisure square had the function of leisure and entertainment. However, due to the large amount of stagnant water in the square and the lack of reasonable maintenance in the later period, a large number of green plants died and the landscape category was single, resulting in waste of land resources. In response to a series of problems, combined with the residents' demand for parking, entertainment, leisure, sports, etc., the Jedi will transform one of the areas and adopt the process combination of "water permeable paving + cover drainage + rain garden". "Green roof", "ecological parking space", "water permeable ring runway", "surface flow constructed wetland" and other projects have become bridges between the residents and the entire regional environment, giving full play to the sponge function of the green space while giving the surrounding residents a rest. And entertainment offers more opportunities and space.

"Green roof (Fig. 2): The roof is originally like an artificial desert. The roof is transformed into a constructed wetland under the ecological concept. The "constructed wetland" model is used to green the gray building on the roof, which is equivalent to changing the desert directly. As a wetland, its ecological contribution will be great. Renovating the roof in the greening and leisure plaza of Lingangjiayuan Community not only realizes the reuse of roof rainwater, but also solves the problem of water leakage in the office area all the year round;

Ecological parking space (Fig. 3): The ecological parking lot is an environmentally friendly and low-carbon parking lot. In addition to high greening and high load-bearing properties, its service life is longer than traditional ecological parking lots. The construction of the ecological parking lot is that the green area in the area is larger than the concrete area, so as to reduce the high greening effect of the gray module, and ensure that the ecological parking lot has superior water permeability to keep the ground dry in real time. This small sponge-like parking lot design not only improves the greening of the square but also solves the problem of parking difficulties for residents;

Permeable runway (Fig. 4): The permeable circular runway has good water permeability and can

quickly penetrate the surface during natural precipitation, which can both store water and reduce urban stagnation. The water permeability also makes the runway free of water in rainy days, which improves the safety and comfort of residents during running. The humanized permeable toroidal runway provides a fitness trail for nearby residents, ensuring the exercise and fitness of the surrounding residents.

Surface Flow Constructed Wetland: Surface Flow Constructed Wetland is not only the hydrophilic space of the citizens, but also close to the sponge structure. Through the sponge construction mode of “seepage, stagnation, storage, net, use and drainage“, the rainwater in normal conditions is made. It can be purified by physical precipitation, microbial media, etc., and then discharged back into the landscape pool to realize rainwater reuse. In heavy rain, rainwater that exceeds the wetland treatment capacity will be transferred to the normal rainwater pipeline and discharged directly into the municipal rainwater pipe network.



Fig. 2 Green roof



Fig. 3 Ecological parking space



Fig. 4 Permeable runway

4. The significance of combining urban pocket parks with urban sponge construction

4.1 Reduce urban shackles and save water resources

At present, due to the heavy precipitation weather in natural disasters in most cities in China, the original drainage system of cities cannot discharge a large amount of rain water in time, so the phenomenon of “ looking at the sea“ frequently occurs. Traditionally used in the way of solving urban waterlogging is the expansion of the urban drainage pipeline, improve the drainage capacity, but the construction of urban drainage system is a long-term project fail to solve the problem of urban waterlogging have appeared in, especially the old old town in the city will appear all sorts of difficulties hinder the construction of drainage pipe network, such as large-scale construction around the block of building affect residents' travel, economy, etc.

As a new model of urban park, pocket park can fully apply the concept of sponge city to the construction of new pocket park. Some central areas with dense urban population are prone to flood disaster in the event of heavy precipitation, and pocket park has become an important way to solve the flood disaster in the urban central area when large-scale drainage pipeline reform is not possible. Because of the pocket park's small size, it can be flexibly built in every corner of the city. Through the construction of the sponge pavement permeability model set up in the pocket park (Fig. 5), rainwater garden (Fig. 6), grassed swales (Fig. 7) and various other facilities, in ensuring that in the urban pipeline fast discharge of rain water at the same time, will collect some of the rain water purification become city life, realize the sustainable recycling of rainwater. “Pocket park” is like a certain area “point” in the city. It should be coordinated and reasonably arranged with “line” (road landscape), “surface” (buildings) and water system of the city. Realize the harmonious development of open space and water resources between city and small environment, and form a sustainable urban ecosystem. Green space is the best sponge, so we should better deal with the cooperation between small green space and large green space, improve the sponge function of small green space, and give full play to the ecological benefits and sponge benefits of pocket park.



Fig. 5 permeable paving



Fig. 6 Rainwater garden



Fig. 7 grassed swales

4.2 Reduce the construction cost and the pressure on urban land resources

Sponge city construction is a new type of urban construction mode which appears when the traditional urban construction mode cannot control water resources. The collection and reuse of rainwater advocated by sponge city construction has become an economical and practical way of water resources development. The construction of sponge city pays more attention to the protection and utilization of natural water system and reduces the scale of urban gray infrastructure construction and significant economic benefits. On the basis of improving the quality of sponge city, a sponge city must be built. Only by improving the overall resilience of a city can its disaster resistance be improved. In the urban areas with a shortage of land resources, it was once a difficult problem to build a large area of sponge city, and pocket park became a breakthrough point for urban sponge reconstruction.

Pocket park is to make full use of the existing land resources in the city, transform all small-scale urban areas into sponges, improve the utilization rate of land resources and save a lot of land resources for urban construction. The combination of sponge city and pocket park can realize the unified construction of the two designs, greatly reducing the cost of urban construction. Pocket park was originally a part of the construction of sponge city, and the connection of landscape water to urban rainwater pipe makes pocket park have the function of rainwater storage and purification. At present, compared with the construction of large rainwater storage tanks or large-scale reconstruction of rainwater pipes, there is a great demand for the reconstruction of old urban areas in the construction of sponge cities. Controlling the number of small “spongiform bodies” is more suitable for the sponge reconstruction in old urban areas, and the spongification of pocket park is a new idea for the sponge construction in old urban areas.

4.3 Close to the life of residents and improve their happiness index

Human beings are an inseparable part of the natural world. They always have various connections with the natural environment. Humans will produce a variety of behaviors, and the development of their behaviors and habits will force changes in the environment. Instead, environmental change and design should meet the needs of users and be consistent with human behavior. When using pocket park, different users have different needs, such as security, comfort, social interaction and so on. The design of pocket park must meet the psychological and behavioral needs of the main body of pocket park. Pocket Park is a small, open, green public space designed to meet people's needs for daily recreational activities. And from the population's specific physiological and psychological behavior characteristics, to meet the population's use of the environment and landscape beauty needs.

5. Conclusion

The combination of pocket park and sponge city can realize the sustainable development of urban ecological economy, which is in line with the national development trend. Based on the

concept of sponge city, pocket park construction can improve the urban function on the basis of alleviating natural disasters, solve the problem of shortage of water and land resources, and provide a happy living environment for urban residents. In a word, the combination of pocket park and sponge city is of great significance to the sustainable development of the city.

References

- [1] Xu Qiuxing. Several problems faced by urban residents in the fast-paced life [J]. *Frontier economy and culture*, 2016(3):67-70.
- [2] Tan Shaohua, Li jin. Pressure release and energy recovery function of urban public green space [J]. *Chinese garden*, 2009, 25(6):79-82.
- [3] Ge shumei. Significance and planning design of urban pocket park construction [J]. *Journal of jiangxi agriculture*, 2012, 24(3):18-22.
- [4] Zhang Yingjie. Symbiosis and development of water ecology and water culture [A].
- [5] Liu Xiaozhao, Tao Liang, Zhang Xian. Construction of "human-water harmony" park green space under the background of new urbanization [J]. *Jiangsu construction* , 2016(04):109-114.
- [6] Shi Teng, Xiao Yue, Zhao Xiumin. From the macro sponge city theory to the micro sponge community building strategy research [J]. *Ecological economy*, 2016, 32(06):223-227.
- [7] Xiao Ming, Bai Qianglin. Measures and enlightenment of sponge city construction [J]. *Green science and technology*, 2016(08):164-166.
- [8] Peng Lele. Research on park green space planning and design under the target of sponge city [D]. *Fujian agriculture and forestry university*, 2016.
- [9] Wang Huan. Discussion on park planning method based on sponge city concept [D]. *Beijing forestry university*, 2016.
- [10] Zhang Wenying. Pocket park: an oasis from the hustle and bustle of the city [J]. *Chinese landscape architecture*, 2007(4): 47-53.