ISSN: 2664-9640

Present Situation and Improvement Strategy of Barrier-Free Environment of Urban Public Transportation

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Abstract

With the rapid development of China's social economy, the travel of disadvantaged groups has become an issue that must be considered in the construction of urban public transportation. Since China started late in the construction of barrier-free environment, the design of urban public transportation environment has not yet considered the issue of barrier-free travel for disadvantaged groups, which is extremely detrimental to building a "people-oriented" harmonious society. Based on this, this paper determines that urban public transportation is the research object, the disadvantaged groups in the city are the target group, and the barrier-free design is the basic concept. First, it analyzes the construction status of the barrier-free environment of urban public transportation at home and abroad, and summarizes the design principles of barrier-free environment from the internal and external environment of urban public transportation. Through analysis, it is concluded that the main problems in the current construction of urban public transportation barrier-free environment in China are 1) misunderstanding of concepts; 2) related laws and regulations are lagging behind and implementation is not in place; 3) traffic barriers and information barriers are weak; 4) The construction of barrier-free transportation facilities is poorly supervised and lacks systemicity and continuity. In response to these problems, five improvement strategies have been proposed, namely: 1) systematic construction strategy; 2) group-oriented differentiated design strategy; 3) special design strategy guided by differentiation of traffic modes; 4) The ease of use strategy of the computer interface in product; 5) Publicity and education strategy.

Keywords

Urban public transportation; disadvantaged groups; barrier-free environment; status quo; improvement strategy.

1. Introduction

As China's economic strength continues to increase, infrastructure construction dominated by urban transportation is also increasing. On the one hand, in order to meet the fast-growing demand for motor vehicle travel, on the other hand, attention to disadvantaged groups has also begun to gain attention. For example, in the design of buses, wheelchair take-off and landing devices are installed. At the beginning of this century, China formulated the urban development orientation of "building a harmonious society" and "people-oriented". The barrier-free design of urban public transportation is a humanistic concept that integrates into society. The increase of barrier-free facilities in the social public environment is not only to help the disadvantaged groups in the city get out of their homes, but also to promote social integration, which is also a beneficial measure to promote the daily social activities of every ordinary person [1].

Based on the ideas of "building a harmonious society" and "people-oriented", this thesis deeply considers the current status of the barrier-free environment of urban public transportation in China, and proposes improvement suggestions for existing problems, so that disadvantaged

ISSN: 2664-9640

groups such as the disabled and the elderly can be more easily integrated Society, reduce the obstacles to travel, and feel the concern from the society.

2. Overview and current situation analysis of barrier-free environment

2.1. Current situation of overseas research

2.1.1 Research on the Status Quo of the United States

In 1992, the US "Older Citizenship Act" required states to invest a certain percentage of each year in the construction of the elderly transportation environment, which has important practical and reference significance for American public transportation, driver safety and traffic engineering. For example, increasing bus coverage and departure frequency, extending weekend and evening service hours, cooperating with the private sector to provide short-distance bus services to nearby communities or bus stops, and computer-aided operations can improve the efficiency and reliability of bus operations. In terms of public infrastructure construction, public transportation and buildings in most cities in the United States are closely connected. The transmission distance between different vehicles or between different lines is very short. Stations or stations or lines and lines are connected by vertical or mechanical equipment to greatly reduce the degree of inconvenience [2].

In terms of public infrastructure construction, the buildings in most cities in the United States are closely integrated with public transportation. The transfer distance between different means of transportation or between different lines is very short, and the station and station or line and line pass through vertical or traffic. The connection of mechanical equipment greatly reduces the inconvenience of travel.

2.1.2 Research on the Status Quo of the European

Since 2005, London has replaced double-decker buses with buses. The new public transportation facilities are more complete, and access facilities for the disabled have been added. Secondly, public transportation in London has been wheelchair accessible. When passing through, the door is consistent with the road surface of the station, and there is a special wheelchair parking area inside the car. Especially for the disabled, London has set up a taxi company for the disabled. These travelers only need to take a taxi at home for door-to-door service, and wheelchairs can directly enter the taxi.

Berlin, Germany is a global leader in barrier-free construction. Berlin regards "barrier-free" design as the basis of urban street design. Equipped with an intelligent guidance system on the road to improve the barriers for people with disabilities to travel. In addition, the intersections are equipped with audible guide lights to open up crossing passages that are convenient for people with disabilities to pass. In addition, the bus company uses network technology to release relevant information to the disabled in a timely manner. Up to now, public transport stations and vehicles in Berlin have reached barrier-free standards.

2.2. Current status of domestic barrier-free buses

The Chinese government attaches great importance to the construction of barrier-free facilities. Since 1989, various departments have successively promulgated the Code for Design of Urban Roads and Buildings Facilitated by the Disabled (for Trial Implementation)", "The Law of the People's Republic of China on the Protection of the Disabled", "The Law of the People's Republic of China on the Protection of the Rights and Interests of the Elderly", and Notice on the Implementation of Several Supplementary Provisions for the Design Code of Urban Roads and Buildings Facilitated by the Disabled" and other laws and regulations[3], including the "Several Supplementary Provisions on the Implementation of the Design Code for Urban Roads and Buildings Facilitated by the Disabled" "Notice" clearly pointed out that it is necessary to strengthen project approval management, strictly control project acceptance, entrances of

ISSN: 2664-9640

public buildings and public facilities, indoor, new, and high-rise buildings under construction, new roads and sidewalks at three-dimensional intersections, road intersections, and unit entrances , Pedestrian bridges, pedestrian tunnels, residential quarters, etc. should carry out relevant barrier-free environment design.

Due to the limitations of the national economy and finance, the development of barrier-free urban public transportation in China has been relatively slow for a long time, and there are few considerations for barrier-free construction. In recent years, major cities have begun to pay attention to the construction of barrier-free environments. For example, Guangzhou has built many barrier-free passages, ramps and other facilities for the city's public facilities, including stone ramps and overpasses on major urban arterial roads. Guangzhou Metro Line 1 also integrates barrier-free facilities into the entire project. Vertical lifts are installed.

3. Design principles of barrier-free environment for urban public transportation

The scope of urban public transportation activities can be divided into two parts. Externally, it can be defined as the external environment of public transportation, including traffic signal facilities, guidance facilities, crossing facilities and platforms, etc.; internally, it can be defined as the internal environment of public transportation, such as Doors, seats, armrests, etc.

3.1. The principle of equal use

The first principle of the barrier-free design of urban public transportation is "equal use", which means that people of different abilities can use it fairly, which greatly reflects the "people-oriented" concept. Urban public transportation design should fully consider the different conditions of different vehicles and different users, and strive to build an easy-to-use identification system and usage method. The unfriendly and difficult-to-use means of transportation make the disabled, the old and the weak a disadvantaged party, thinking that they are people who need the care of others to live a good life, thus forming their inferiority mentality. Therefore, the principle of equal use of urban public transportation is the first step to ensure a barrier-free environment for the entire city.

3.2. The principle of ease of use

Transportation must be easy to operate, safe and convenient for all users or potential users, and its ideal goal is to ensure that the disabled and the elderly can use transportation without obstacles. In principle, the design of urban traffic barrier-free environment should consider the behaviors, consciousness and actions of these people when using transportation, cater to the needs of these people, remove obstacles for users, and provide all people including the disadvantaged groups in the city. The greatest possible convenience.

3.3. The principle of technical pertinence

With the development of science and technology, the public transportation environment of barrier-free cities should be combined with advanced technology to realize the mobility of urban public transportation. Foreign accessibility technology can be divided into vehicle improvement technology, signal control technology, information service technology, etc. South Korea and Japan have upgraded the vehicles used by various disabled people to meet the actual needs of these people. Public transportation in Brazil and France is closely integrated with other transportation facilities to realize intelligent, informatized, and humanized transportation operation management and information services[4]. At home, we should establish a barrier-free technology concept with Chinese characteristics and carry out targeted transformations for buses, streets and urban roads.

ISSN: 2664-9640

3.4. Security principles

In the construction of the external environment of urban public transportation, safety must first be ensured. On the one hand, it is necessary to protect the safety of passengers and avoid hidden dangers; on the other hand, the facilities should be complete and comfortable to use. The health factors of urban vulnerable groups, such as the disabled and the elderly, are more insecure than healthy people. Therefore, in the construction of the external environment of urban public transportation, full consideration should be given to maximizing the increase of passengers, especially the safety of traffic vulnerable groups. For example, in the barrier-free construction of urban roads, in order to facilitate the travel of disadvantaged groups such as the disabled and the elderly, the height difference between the crosswalk and the road should be reduced as much as possible; the intersections of major and secondary roads and public transportation The crosswalk at the exit of the station should be designed as a device with a ramp device and audio equipment for prompting the blind track.

4. Existing problems in the construction of barrier-free environment for urban public transportation in my country

Compared with the achievements of public transportation barrier-free environment construction in developed foreign cities, due to the late start in this regard in China, the foundation of urban public transportation barrier-free environment construction is still very weak, which is also related to the current economic development of our country. In this way, some misconceptions in the construction of the barrier-free environment for urban public transportation in our country are still worthy of great attention. The main problems are as follows:

(1) Misunderstanding of concept

The purpose of the barrier-free environment of urban public transportation is the freedom of travel for the disabled and the elderly, expand their scope of activities, improve their ability to participate in social activities, and better enjoy the material and cultural progress that it brings. Caring for disadvantaged groups and building a barrier-free urban public transportation environment reflects the social environment of love, equality and friendship. On the other hand, it also reflects the social civilization of a city or even a country. As China's economic development level is still relatively backward, the society generally does not understand the travel problems of the disabled. There is no clear stipulation in the relevant national urban traffic design codes, and leaders or design engineers at all levels are interested in urban public transportation. The understanding of the construction of barrier-free environment is still not in place, and it is deemed unnecessary. These misunderstandings have excluded a large number of urban vulnerable groups from social public resources. Therefore, in the process of building a barrier-free environment for urban public transportation, leaders at all levels should change their thinking.

(2) Laws and regulations lag behind

On the one hand, due to the relatively late establishment of the concept of barrier-free environment for urban public transportation in China, the ideological understanding of barrier-free environment for urban public transportation requires a gradual process. The legal norms reflected in this thought are synchronized with it, so the construction of relevant laws and regulations is relatively lagging; on the other hand, the construction of urban public infrastructure in China is not perfect and cannot meet the simple needs of urban residents for basic travel. This is also in line with relevant laws. The lag of regulations is related. Moreover, due to people's conceptual misunderstandings, many laws and regulations that have been enacted cannot be implemented. Although relevant units have formulated many regulations, in

ISSN: 2664-9640

many cases, design units and construction units have not regarded them as strict regulations.
Traffic accessibility and information accessibility are weak

The barrier-free facilities of the transportation infrastructure are weak, and the voice broadcast function is not set up at ordinary urban intersections, which alone causes a great obstacle to the visually impaired. In the process of transportation construction, the basic needs of the disabled were not taken into consideration. The construction of the whole city adopted a model, which greatly restricted the travel of the disabled. For example, at many intersections in the city, there are no blind track prompts and traffic sound prompts, which completely restricts the travel possibilities of the visually impaired.

(3) Lack of supervision over the construction of barrier-free transportation facilities

It is very common for urban public transportation barrier-free facilities to be occupied and damaged indiscriminately. The completed barrier-free facilities were not maintained in time, and the newly-built barrier-free passages and facilities were effectively used. In recent years, Beijing has increased the intensity of urban blind road construction. However, with regard to the construction of the blind track, the relevant departments only focus on the construction and not the protection, which has caused a large number of blind tracks to be seriously damaged, with poor results and no actual results. In addition, blind tracks are usually built on the side of urban pedestrian crossings. Due to the lack of strict management regulations, pedestrian blind tracks are occupied by vehicles, and the braille guide signs on buses are also covered by advertisements, which greatly affects the safety of the blind. Since China has not formed an effective legal system to regulate the construction of urban barrier-free transportation environment, urban barrier-free environment often becomes a by-product of the political climate, or embellishment of urban beautification, lack of system and continuity, no overall planning, intermittent construction, no actual effect.

5. Improvement strategy

Systematic construction strategy

The first is that the relevant departments systematically improve the construction standards for the barrier-free environment of urban public transportation, regulate the entire process from the design guidance level, and correctly guide the public's awareness. Both the design unit and the construction unit must regard the barrier-free construction of urban public transportation as a rigid task to carry out actual development and construction. The second is the systematization of spatial development. The construction of a barrier-free environment for urban public transportation should be interspersed with all aspects of the city's comprehensive development and coordinate with the development and construction of the city. Public transportation construction is an important part of the urban external space. The design of the urban public transportation barrier-free environment should be incorporated into the entire urban public space planning network, establish its position in the overall planning and design relationship, and maintain its spatial form and the surrounding environment. Continuity of design [5].

Distinguishing design strategies under the group orientation

Vulnerable groups in the traffic environment do not only rely on barrier-free design in road planning to meet their needs. According to the definitions of the International Health Organization and the China Disabled Persons' Federation, persons with disabilities can be divided into five categories: 1) physical disability; 2) visual disability; 3) hearing disability; 4) intellectual disability; 5) speech disability [6]. Take physical disabilities as an example. It can be divided into upper limb disability and lower limb disability. The difficulties encountered by these two groups in the public transportation environment are very different, and the functional and structural requirements of the same public transportation auxiliary facilities are

ISSN: 2664-9640

different. Therefore, in the process of designing the barrier-free environment for urban public transportation, designers should treat different types of disabled groups in a targeted and differentiated way, taking into account their psychological and physical needs, so as to solve the problem on this basis. The travel problem of the group of people.

Special design strategy based on the differentiation of traffic mode

The transportation environment of today's era is a very large system that integrates transportation methods such as walking, buses, rails, and network cars. However, the rules that people need to follow are different in different traffic environments and equipment. In this complex traffic environment, the disabled may encounter different travel obstacles each time they travel. Before developing and designing new auxiliary facilities and products, planners should fully understand the behavior patterns of the disabled and the elderly in different traffic environments, analyze the obstacles associated with each behavior, and map the behavior of different traffic modes to special designs .

The usability strategy of the man-machine interface in the product

The convenience of the construction of a barrier-free environment for urban public transportation is not only reflected in the product scale and function settings; it is more in the interactive design of man-machine interface. The man-machine interface is a direct medium that reflects the interaction between the user and the product and transmits information. The usability strategy of the man-machine interface also has its own differences for different user groups. There are two main points: one is the singularity of the button design, avoiding the use of human senses to select the interface; the second is the image of the flat symbols in the interface to ensure that the disabled can easily and accurately obtain information.

Publicity and education strategy

The construction of urban public transportation environment is a long-term work. Judging from the current status of the construction of urban barrier-free environment in China at this stage, most of the problems in construction are caused by mistakes in concepts. There is a kind of "it does not matter in Chinese people's thinking." The erroneous concept of “self, hang up high” often means that government leaders are also healthy people, and it is difficult to realize the difficulty of traveling for disadvantaged groups such as the disabled and the elderly. Therefore, it is inevitable that guarantees will be ignored in the process of urban infrastructure design and construction. The interests of urban disadvantaged groups. In order to effectively promote the construction of a barrier-free environment in cities, publicity and education should be increased. From students to all walks of life, creating a barrier-free transportation environment is for everyone, not just for the disabled and the elderly. And other vulnerable groups.

Carrying out relevant publicity and education is one of the means to promote the smooth implementation of the construction of a barrier-free environment for urban public transportation, and it also better lays a solid foundation for the implementation of related policies. Further improve the laws and regulations on the construction of the barrier-free environment of urban public transportation, guide the construction of infrastructure to better meet the travel needs of disadvantaged groups such as the disabled and the elderly, and create a harmonious social atmosphere.

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ISSN: 2664-9640

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