

Spatial Distribution and Usage Characteristics of "Workers' Harbor" from the Perspective of Opening and Sharing

A Case Study from Tianjin, China

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Abstract

As China's urbanization gradually entered the stage of high-quality development, "Opening and Sharing" has become a basic requirement for the regeneration of public service facilities in large cities, which means that social public services should be open to different social groups, especially to provide equal social services for the vulnerable groups. Since 2018, public service facilities in Tianjin, such as banks, have gradually opened up their resources to provide outdoor workers and others with a range of social services such as catering and rest, achieving opening and sharing of space while caring for the social needs of vulnerable groups. By providing the community with open facilities and shared service resources, the "Workers' Harbor" has to a certain extent met the key demands of outdoor workers. However, in the process of field research, it was found that the open sharing of facilities and services at the policy level, led by the government and enterprises, has unreasonable spatial and temporal distribution and spatial design, and thus does not match with the bottom-up demand of workers, resulting in the "Workers' Harbor" not being used reasonably and effectively, and outdoor workers not fully accepting and enjoying the social benefits. Based on a study of the spatio-temporal distribution of "Workers' Harbors" in the central city, this study takes a typical Workers' Harbor in Nankai District of Tianjin as an example. Based on the psychological characteristics of outdoor workers' daily behavior, the study analyzes the differences between workers' demands during their daily hours and the spatial distribution and functional supply of harbors by using literature research, interviews, questionnaires, emotional-semantic analysis and network analysis, and then makes suggestions for the planning and management of workers' harbors from the perspective of improving the sharing quality.

Keywords

Opening and Sharing; Outdoor Workers; "Worker's Harbor"; Spatial and Temporal Distribution; Policy Governance

1. Introduction

Since the 19th National Congress of the Communist Party of China, China Construction Bank (CCB) has put forward the goal of "serving the people's well-being and building a modern and beautiful life" and has promoted three major strategic transformations. It has focused on building the "second growth curve" and proposed solutions to address social pain points and difficult issues using financial resources. In this context, CCB adheres to the concept of "open sharing and taking responsibility" and leverages its natural advantages of having a large number of branch outlets and direct interaction with customers to establish "Harbors for Workers" throughout the bank (Bing Yi, 2019; Jingfang Nie, 2017; Shui Qi, 2019).

Since 2018, CCB has gradually opened up its service resources for its branch outlets, with a focus on providing thoughtful and considerate services to outdoor workers such as sanitation workers, food delivery riders, and couriers, as well as vulnerable groups such as the elderly, disabled, sick, and pregnant women. The aim is to provide them with a place to rest when tired, access to drinking water when thirsty, hot meals when hungry, and charging facilities when their devices are out of power. Currently, the bank has opened 14,300 "Harbors for Workers," and the cumulative offline services have exceeded 50 million person-times.

China Construction Bank (CCB) provides unified service facilities such as water dispensers, resting tables and chairs, Wi-Fi, mobile phone chargers, books, rain gear, and first aid kits. They have also launched the "Harbors for Workers" mobile app, making it convenient for outdoor workers to locate service stations anytime, anywhere. On September 1, 2018, CCB held a press conference in Beijing to announce the launch of "Harbors for Workers" across all its branch outlets. On April 24, 2019, the All-China Federation of Trade Unions awarded the "Harbors for Workers" service stations of CCB the official certificate, making it the first officially recognized brand for co-built service stations for outdoor workers in the country. Currently, the CCB branch system in Tianjin has opened 265 "Harbors for Workers" to the public, serving over 4,000 people per week (Haiyue Dou, 2015; Meiting Li, 2015; Zhi Li, 2014).

Regardless of the severe cold or scorching heat, in every street and alley, one can see the busy figures of outdoor workers. For a long time, they have made indelible contributions to the urban landscape and various construction activities, going out early and returning late every day. However, due to the lack of fixed resting places, they often find themselves in difficult working conditions where they "get dressed at home, work up a sweat on the job, and return home covered in dust." Most outdoor workers are willing to endure dirt and exhaustion in exchange for a clean environment for countless families. They deserve the care and respect of the entire society (Jingsu Yao, 2018).

According to investigations, there is generally high attention to the living conditions of outdoor workers in society today. However, these compassionate facilities have not been fully utilized due to various reasons, and many outdoor workers still have not benefited from these social welfare measures. Resource sharing should not only be reflected in policy but also in thoughtful spatial design, making it easier for people to accept and use them.

China's 13th Five-Year Plan puts forward five development concepts: innovation, coordination, green development, openness, and sharing. The concept of sharing, in essence, is about adhering to a people-centered development ideology, embodying openness, equality, mutual benefit, and focusing on addressing social fairness and justice issues. Sharing social resources with workers reflects the openness and inclusiveness of society.

This study is conducted based on the actual needs of outdoor workers, with the following main objectives:

1. Investigate the distribution and utilization status of Laborer Harbors within the central urban area of Tianjin. Utilize survey questionnaires to gain in-depth understanding of outdoor workers' comfort in using the harbors.
2. Conduct in-depth research and optimization design of Laborer Harbors based on the existing

issues in terms of service radius, spatial layout, functional zoning, and service signage, as well as the work and living needs of outdoor workers.

2. Methodology

2.1. Definition of outdoor workers and study area

The population of outdoor workers is characterized by complexity and variability. Through preliminary data review and pre-survey, this study has identified three main categories of outdoor workers: sanitation workers, food delivery riders, and courier personnel. These workers are characterized by their non-fixed work locations, high work intensity, and long hours spent working outdoors.

Through the spatial location research of the Construction Bank's Laborer Harbor stations in the central urban area of Tianjin, it can be analyzed that the distribution of the Construction Bank's Laborer Harbor stations is relatively even, covering all six districts of the city. By observing the kernel density map, it can be noted that the stations in Nankai District have a higher distribution density and a more complete sharing system. On the other hand, the distribution density of the Construction Bank's Laborer Harbor stations in Hedong District and Hongqiao District is relatively low, indicating a relatively limited potential for sharing (Figure 1).

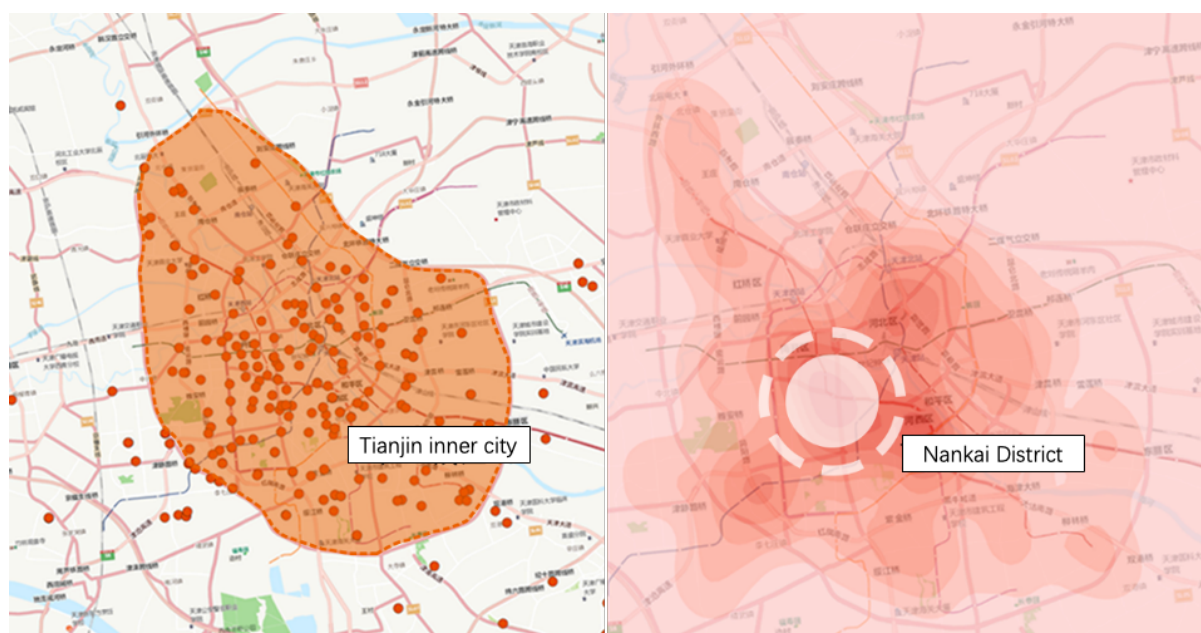


Figure 1. Analysis of the distribution of workers' harbor in the central city of Tianjin

The meso study area is a 2km radius coverage area with Nankai Branch Harbor as the center of the circle, and the micro level focuses on the relationship between Nankai Branch Harbor and the surrounding harbors (Figure 2).

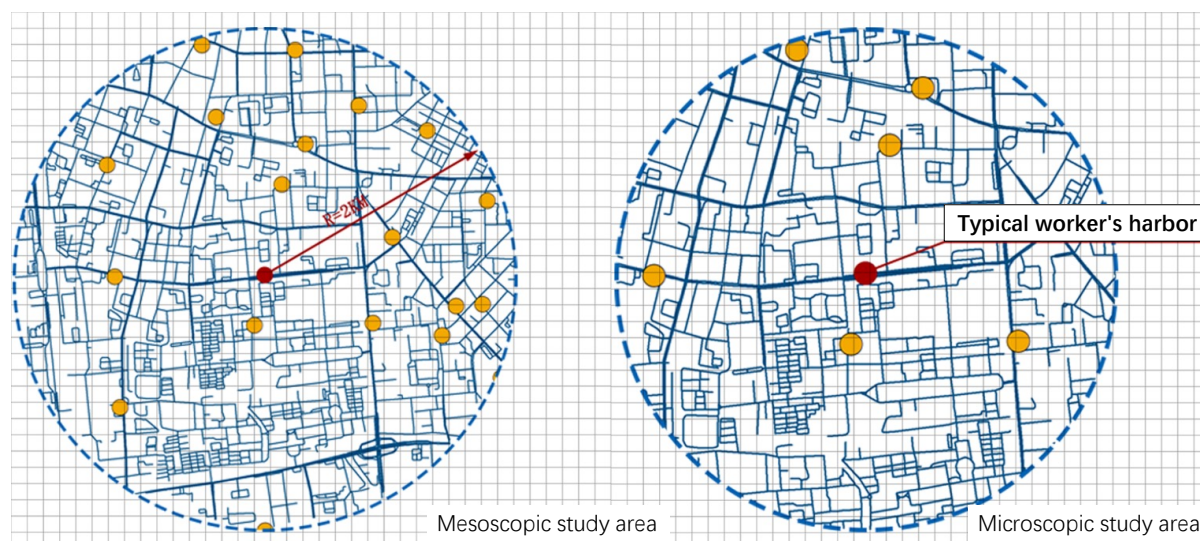


Figure 2. Meso-Micro Scale Worker's Harbor Study Area

2.2. Research methods

This research employed a combination of various research methods (Figure 3). In addition to literature review, field investigations, interviews, and questionnaire surveys, this study also utilized methods such as sentiment analysis and GIS network analysis to provide rational justifications based on the research content. A total of 200 questionnaires were distributed in this research, with 193 responses received, resulting in a response rate of 96.5%. Emotional and semantic data were obtained through on-site interviews, while the setting standards of the harbor stations were obtained through collaboration with the bank department. Geographic locations and service function data of the harbor stations were obtained through the Laborer Harbor APP.

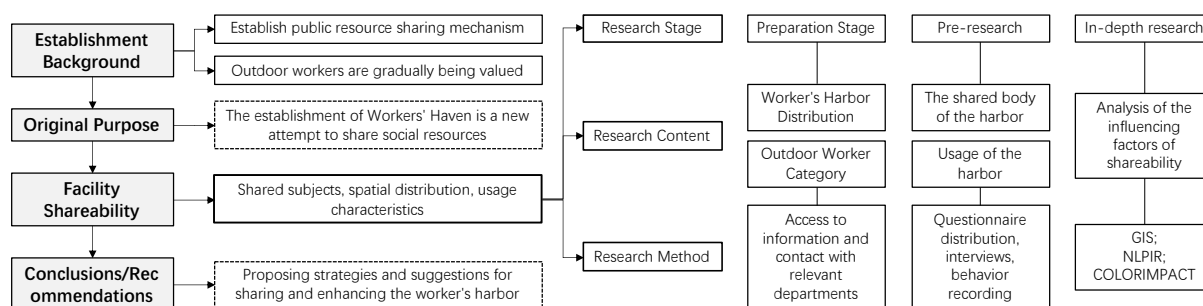


Figure 3. Research Framework and Process

3. Spatial Distribution Analysis of Worker's Harbor

3.1. Macro-scale Worker's Harbor Service Area Analysis

By collecting data from the Laborer Harbor app, a 5, 10, and 15-minute walking service area model was constructed with the Construction Bank's Harbor as the center. The analysis revealed that the walking service area of 15 minutes can generally cover most of the areas. However, there are still large areas within

the reach of the 10 and 5-minute walking service areas that are not covered by the Laborer Harbor service range.

3.2. Mid-View Scale Worker's Harbor Service Area Analysis

Based on the transportation modes of outdoor laborers, the accessibility service area of Nankai Branch based on the urban road network was delineated. The network connectivity and functional complementarity between this area and the surrounding harbor sites were analyzed to assess the regional-level sharing capacity. By establishing a road network system model around the Nankai Branch Laborer Harbor and analyzing the 5, 10, and 15-minute walking service areas of various laborer harbors in the region, it was found that the coverage of laborer harbors in this area is relatively wide, and the 15-minute walking service area has achieved nearly complete coverage. Analyzing the 5-minute cycling service area for sanitation workers and food delivery riders, it was found that the placement of laborer harbors has effectively achieved full coverage of these two types of outdoor laborers who primarily rely on cycling (Figure 4).

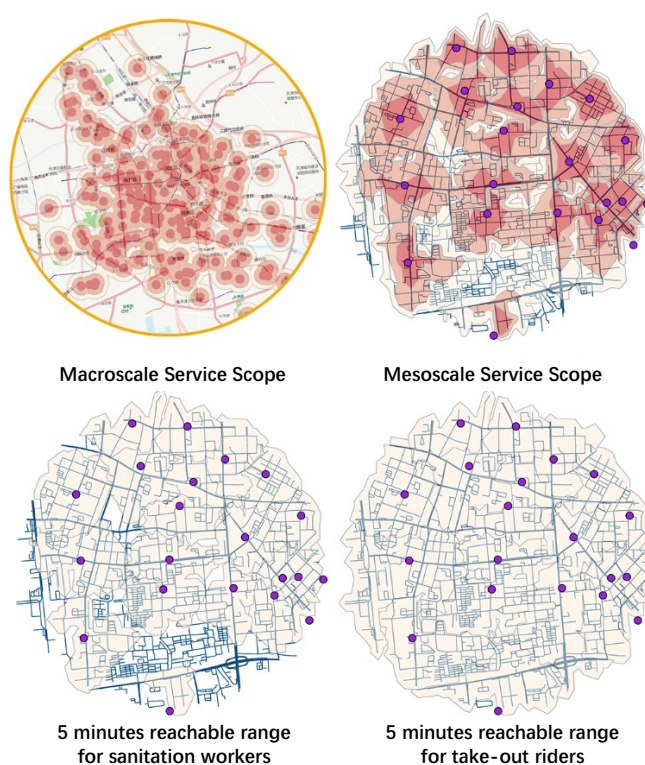


Figure 4. Analysis of the scope of services provided by Worker's Harbor

3.3. Micro-scale Worker Harbor Service Area Analysis

Taking Nankai Branch as the research subject and narrowing down the study area, we established the 5, 10, and 15-minute walking service areas and the 5 and 10-minute cycling service areas based on Nankai Branch. Through analysis, it was found that there are 2 laborer harbors within the 15-minute walking distance and 5 laborer harbors within the 10-minute cycling distance. This indicates that Nankai Branch's laborer harbor has good network connectivity and coordination with the surrounding harbor sites, and the overall area has a strong sharing capacity (Figure 5).



Figure 5. Workforce Harbor Walk & Ride Service Scope Analysis

4. Shared subjects of the workers' harbor

4.1. Target group composition and characteristics analysis

4.1.1. Sanitation workers

Work Time Characteristics: Full-time work starting as early as 4:00 in the morning, with two shifts in the morning and afternoon during the day, with a 1-hour break at noon, and at least 8 hours of work per day.

Age Characteristics: The age structure is mainly composed of middle-aged and elderly individuals, showing a significant trend of population aging. Nationwide, about 40% of sanitation workers are over 55 years old, and over 10% are over 65 years old, with an average age of 61.

Psychological Characteristics: Most sanitation workers are humble, hardworking, and down-to-earth. They may have a sense of occupational inferiority and are not accustomed to receiving excessive attention. They try to avoid causing trouble for others and are grateful for the kindness shown to them.

4.1.2. Takeaway Riders

Work time characteristics: The main working hours are from 11:00 to 14:00 during noon and from 18:00 to 20:00 in the evening.

Age characteristics: Male individuals dominate the group of food delivery riders, and their ages mainly range between 20 and 40 years old.

Psychological characteristics: They hope to receive recognition and respect from society, value delivery time, and seek understanding and acknowledgment from customers.

4.1.3. Courier

Work time characteristics: Couriers typically work from 7:00 in the morning to 19:00 in the evening, with a total working time of approximately 12 hours. They usually do not take a break during noon, and have their lunch while on duty. They are even busier during holidays and festivals.

Age characteristics: The age range of couriers is mainly between 20 and 50 years old, with around 50% of them being between 20 and 25 years old, and approximately 30% between 25 and 35 years old.

Psychological characteristics: Couriers experience busy work schedules, have shorter rest periods, and are not accustomed to receiving excessive attention.

4.2. Target group demand analysis

The three types of workers primarily use the harbor for resting, with a relatively higher demand for rain gear among food delivery riders and couriers. From interviews with sanitation workers, it can be analyzed that the awareness of the worker harbors is relatively high within this group. Sanitation workers mostly use the worker harbors for resting, but due to the nature of their work and the nature of the bank premises, they feel hesitant to enter the harbor to rest. Overall, sanitation workers consider this initiative beneficial, but in actual usage, they may experience fear and discomfort psychologically. There is a certain level of awareness of the worker harbors among food delivery riders, but the number of people actually using them is not high. Food delivery riders need a shady place to wait for orders, but considering the parking of their vehicles and the specific timing of food delivery, they do not choose to enter the worker harbors. However, they have a positive attitude towards the establishment of the harbors. From interviews with couriers, it is known that they have some understanding of the worker harbors. Based on their emotional analysis, most couriers consider the worker harbors to be a good measure. Since couriers typically carry their own power banks and other devices for work, their demand for using the worker harbors is not high. From interviews with ordinary pedestrians, it is evident that the awareness of the worker harbors is relatively low among this group. Once they understand the specific functions of the worker harbors, they believe that the harbors have significant social welfare value in emergency situations and have a positive evaluation of the worker harbors. Interviews with bank employees reveal that they hold a positive attitude towards the worker harbors. They believe that the harbors are more inclined to provide rest for those who are conducting business. People mostly use the facilities such as restrooms and charging stations, while the usage frequency of emergency functions is relatively low.

5. Research on the use of workers' harbor

5.1. Research on Worker's Harbor

5.1.1. Worker's Harbor External Legibility Study

Most sanitation workers believe that the identification of the worker harbors is recognizable, and their understanding of the worker harbors is related to their work nature and content. Through questionnaire analysis of other occupational outdoor workers, it is found that:

82.86% of the workers have no knowledge of the worker harbors, and 17.14% of the workers know about them but are unclear about their specific locations. Among those who are aware of the worker harbors, most of them believe that the signage is not prominent enough.

This indicates that the worker harbors have good recognizability within specific groups but low recognizability among the overall outdoor worker population. Looking at the logo design of the worker harbors and the color design of the bank's outdoor harbor signage, they have similar colors, making it difficult to distinguish the worker harbor's identification from the bank's signage, thereby reducing the potential sharing capability of the harbors.

5.1.2. Time shareability research

The earliest working hours for sanitation workers are 4:00 a.m. in the morning and 7:00 a.m. for delivery and couriers, while the opening hours of the Construction Bank are 9:00 a.m. to 17:00 p.m. Since the Workers' Haven is located inside the bank, it cannot meet the needs of outdoor workers on a 24-hour basis.

5.1.3. A Study of the Spirit of Place in Workers' Harbor

The worker harbor, as a "harbor," differs from ordinary sites in that it possesses specific characteristics of a harbor, emphasizing the shelter, safety, and comfort created by a people-centered space. The nature of

banks is characterized by high vigilance, surveillance, and high security, particularly in relation to their external spaces. From a societal perspective, banks do provide shelter and safety, as people choose to deposit all their assets in banks based on this consideration. However, when considering the human aspect, the direct and intense sense of shelter and security provided by banks can make some individuals uncomfortable due to the surveillance and vigilance.

Comparative analysis was conducted between the uniform colors of sanitation workers, delivery riders, and couriers and the main color tones used within banks to reflect the likelihood of users being noticed based on the color composition and attributes, thus reflecting the psychological comfort of harbor spaces. The ColorImpact software was used to analyze the primary color compositions of banks and the main outdoor workers (sanitation workers, delivery riders, couriers). It was found that the main environmental color in banks is a light neutral gray, which emotionally conveys neutrality and aligns with the characteristics of social public spaces such as banks. In contrast, the outdoor workers' uniforms use colors such as orange-red, blue, and yellow to enhance visibility and improve their safety in outdoor work environments.

The problem lies in the fact that these three colors stand out too much against the gray background of the bank. As a result, the actions of workers using the worker harbor easily draw the attention of other individuals inside the bank, conflicting with the privacy that a harbor should provide and causing discomfort among those using the harbor who feel they are being monitored.

5.1.4. Research on the use of Worker Harbor App

Current Situation: The QR code of the app is attached to cards on the tables of the worker harbor in the bank and on the bank's pull-up banners. Only those who enter the bank or carefully stay at the worker harbor will notice it, and most people do not scan the code to download the app. The app has a low usage rate.

Target Users: Outdoor workers, especially sanitation workers, tend to be older, and for them, mobile phones are only tools for making and receiving calls. Therefore, the app is not widely used among this service group.

User Experience: The current app is not well-developed and has login vulnerabilities, indicating an incomplete operational management system.

Types of Functions: The app lacks innovation in terms of functionality. Its main purpose is to provide reminders and map guidance to nearby worker harbors, indicating the specific features of each harbor. The app prominently promotes functions such as drinking water, toilets, internet access, and charging.

5.2. Research on the functional use of workers' harbor

5.2.1. Nankai Branch User Population Research

The worker harbor in Nankai Branch has internal spatial and functional characteristics, so it currently mainly serves customers conducting business transactions. Although it is named "worker harbor," in essence, it primarily caters to customers conducting business transactions or internal bank employees. It does not effectively serve a wide range of outdoor workers. Throughout the day, the facilities provided by the worker harbor are primarily for drinking water and resting, with most users being customers conducting business transactions. The usage frequency of other facilities is relatively low. The main users of the worker harbor are outdoor workers, particularly sanitation workers, as they have more flexible working hours and convenient access to the surrounding business establishments.

5.2.2. Nankai Branch Exterior Annex Space Comfort Study

The exterior space of the Nankai Branch is equipped with parking spaces for motor vehicles and non-motor vehicles (bicycles and electric scooters). The parking spaces for non-motor vehicles are located near the entrance of the Nankai Branch, while the parking spaces for motor vehicles are situated on the side closer to the road and are accompanied by roadside trees. As a result, the non-motor vehicle parking area is exposed to the scorching summer sun, making it unsuitable for long-term parking. This reduces the likelihood of workers entering the harbor and weakens its potential for sharing.

5.2.3. Nankai Branch Harbor Internal Legibility Analysis

The laborers' harbor is located on one side of the main functional area of the Construction Bank, and its visibility is relatively low. This to some extent establishes the spatial position of the harbor as a subsidiary functional space within the bank. The guidance provided by indoor signage helps compensate for the low visibility in that area. However, overall, the identification of the harbor is still relatively low.

5.2.4. Research on sharing the functions of Nankai Branch Harbor

Through investigating the needs of different types of outdoor workers and the services provided by the laborers' harbor, and coupling the two for analysis, it is found that the harbor can meet the needs of most outdoor workers. From the perspective of providing functions in the harbor, the current sharing situation is good, as most commonly used functions are utilized by different types of outdoor worker groups. However, there are still certain functions that are underutilized, such as the nursing room, magnifying glass, umbrellas, canes, etc., which have a low frequency of use among outdoor workers. These functions are mainly targeted towards people waiting to conduct business or a small number of passersby.

6. Conclusion and optimization suggestions

6.1. Nankai branch level optimization suggestions

6.1.1. Optimize the internal space layout

Based on the high surveillance nature of banks, which causes psychological discomfort among users of the laborers' harbor, as well as the psychological gap resulting from social group differences, it is recommended that the establishment of the laborers' harbor should prioritize the privacy and psychological sense of security of the users. It is suggested to provide laborers with autonomy in using the harbor. Additionally, it is recommended to separate the laborers' harbor from the service hall with frosted glass to create a sense of privacy in the space.

6.1.2. Enhance exterior space comfort

It is recommended to improve the plant configuration in the external space of the Nan Kai Branch site to provide sufficient shade during the summer and meet the needs of laborers for longer stays. Additionally, enhancing accessibility design is advised, such as adding ramps to ensure convenient access for laborer vehicles. Moreover, increasing the recognizability of the site through the use of directional signage, such as adding signs on the street and implementing a ground-level signage system, can help guide the attention of sanitation workers.

6.2. Suggestions for optimizing the Worker's Harbor level

6.2.1. Site layout optimization

Through analyzing the distribution of laborer harbors in the area, it is observed that the placement of the Construction Bank's laborer harbors achieves nearly full coverage within a 15-minute walking service radius. However, there is still a significant portion that remains uncovered within the 5- and 10-minute service radii. It is recommended that Construction Bank strengthen cooperation with neighborhood committees,

vegetable markets, and other relevant establishments to establish laborer harbors based on these organizations. By doing so, it will provide a more comprehensive and robust shared service system in the areas where Construction Bank sites do not currently cover.

6.2.2. Color configuration optimization

The large expanse of neutral gray color in the bank serves to prominently emphasize the presence of laborers entering the bank, which may attract excessive attention or even create a sense of surveillance from other individuals. Considering the nature of the bank environment, it is recommended to focus on optimizing the colors of the facilities within the harbor area (tables, chairs, signage, pavement, etc.) only. Similar colors have the characteristic of harmonious coordination but lack strong contrast. Therefore, it is suggested to use colors similar to the uniforms of laborers as the main color scheme.

6.2.3. Worker Harbor App Optimization

It is recommended that relevant departments improve the existing app, establish and enhance the laborer harbor database, develop more functionalities, and build an information system that tracks the usage and needs of laborers. Additionally, it is important to improve the feedback mechanism for harbor usage in order to better serve the laborers.

6.2.4. Expanding advocacy efforts

Currently, the promotion of the laborer harbor is insufficient, and the majority of laborers are unaware of its existence as their companies have not officially informed them. The QR code for the app is also only placed inside the harbor. It is recommended to increase both online and offline promotional efforts for the laborer harbor. Organizing various activities that benefit the laborers and enriching the harbor's functionalities will help establish it as a true temporary resting place for laborers.

6.2.5. Time Share Optimization

Based on the construction of multifunctional laborer harbors, many laborer harbors are built in conjunction with public restrooms, urban waste transfer stations, and other facilities. Therefore, the issue of time sharing also arises. It is recommended to improve the self-service system that operates throughout the day. In cases where laborers have needs during the non-operating hours of the harbor's location, methods such as QR code access can be implemented to achieve round-the-clock sharing.

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