

Proposing Directions for Urban Design to Improve the Inclusiveness of the Port Hinterland

Hwang Sun Ah*

*Visiting Professor, Department of International Education, University of Architecture Ho Chi Minh

*Full Time Researcher, Urban Affairs Research Institute, Pusan National University, Korea

Abstract : The port space can be considered to be the space in which the characteristics of the port city are best expressed. Also, since it acts as a representative gateway along with the airport, it can have a direct impact on the image of the region and country. However, the harbor hinterland has been a refuge during the war in the past, and it has been concentrating on development related to the port industry; hence, it has a poorer residential environment. Therefore, in this study, in order to ensure equal development in space and equal access to basic urban services, urban design directions were suggested for the harbor hinterland based on the concept of an inclusive city'. To this end, through factor analysis, urban planning elements that can be applied to urban design were derived, and through PLS(Partial Least Square)regression analysis, based on the opinions of residents and experts, urban design directions for the port hinterland were presented. The study site was Gamcheon Port, one of the Busan Ports in Korea, the hinterland of Gamcheon Port was a high slope, and the residential environment was relatively poor due to the dense concentration of older residential areas.

Key words : inclusive city, port hinterland, spatial inclusiveness, urban design, PLS(partial least square)regression analysis

1. Background and purpose

The port hinterland, that is, the established urban area in contact with the port space, has been directly and indirectly influenced by the revival and decline of the port industry from the past to the present. Therefore, it not only has many social, economic, and historical significance, but is also in the spotlight as a landmark space in the region. Accordingly, Korea has been carrying out a number of large and small development projects targeting the port hinterland, but most of them are focused on development within a confined space related to port functions rather than highlighting the environment and characteristics of the port hinterland. The result of these developments can make the residential and living environment of the port hinterland still somewhat bad environment to other areas, and can negatively affect the image as a port city, so development and management must be done from a long-term perspective. This study was conducted on the basis of the argument that it is desirable for cities in modern society to revitalize in the rapid flow of change, but it is also necessary to consider balanced development with space in the process of growth and decline. Therefore, in this study, the direction of urban design was suggested so that anyone can enjoy the right to the city in the midst of rapid social change, and that problems arising in a declining space can

be minimized.

As described above, the port hinterland has a poorer residential environment and urban infrastructure than the urban area. It was judged that this could lead to a problem of imbalanced development and could be the starting point of a social imbalance problem. Therefore, the research was conducted based on the concept of 'Inclusive City', which is the core content of securing rights to cities, reducing inequality issues within the city, and ensuring equal access to housing and basic city services.¹⁾

2. Meaning of Inclusive City

An inclusive city refers to a city that promotes fair growth regardless of economic means, gender, ethnicity, religion, etc., and is defined as a place where all city residents can participate in the economic, political and social opportunities provided by the city.(Park, 2015) Recently, UN Habitat also introduced the concept of an inclusive city as a new policy agenda in order to improve the quality of life of urban residents socially, spatially and politically.(Byeon, 2017) The keyword of an inclusive city can be called 'right', and the characteristics of this concept are (1) a city that overcomes social exclusion and embraces each other without excluding each other, (2) a city that can be easily accessed even the socially underprivileged, and (3) a city

* 정회원, sahwang38@gmail.com

1) 「Right about the city」, p.70, Kang Hyeun Soo, Bookworld

where everyone participates in the decision-making process.(Kang, 2012)

However, there are not so many prior studies related to inclusive cities. Moreover, there is no research on 'Inclusive City' targeting port cities where the phenomenon of separation between spaces occurs due to spatial function and historical environment. Accordingly, prior studies related to concepts similar to an inclusive city such as "barrier-free", "universal design", "crime prevention environment design (CPTED)", a measure to realize a physically safe city, and "women and the elderly", an urban policy that secures inclusiveness primarily for women and the elderly, and previous research on the concept of residential welfare to expand spatial inclusion of friendly cities and low-income families were reviewed as show in Table 1.

Table 1 Inclusive city definition by sector

Division	Meaning of Inclusive city
UN Habitat (2004)	A place where all city dwellers, regardless of economic means, gender, ethnicity or religion, can participate in the economic, political and social opportunities that cities have to offer.
Gerometta.J (2005)	The concept of guaranteeing interdependence through cooperation, reciprocal networks, and solidarity and the ability to participate in all areas such as politics, social culture, and education.
World Bank(2015)	A city where all classes can participate in social and economic fields Slum District Improvement + Low-Income Housing Subsidy Program + Inclusive Urban Planning + Poverty Reduction + Socioeconomic Policy.
Park(2015)	A city that overcomes social exclusion. A city that achieves or aims for social inclusion.

As a result of reviewing related prior studies and similar concepts, inclusive cities could be largely divided into spatial inclusion, social inclusion, and economic inclusion. The items related to spatial inclusion and socio-economic inclusion are summarized in Table 2 below. This study aims to suggest urban design directions to alleviate the spatial imbalance problem in the port hinterland. Therefore, social inclusiveness was excluded from the scope of the study in order to clarify the purpose of the study.

Table 2 Items related to spatial inclusiveness and socio-economic inclusiveness

Main Category	Medium Category	Contents
Spatial inclusiveness	Space safety and universality	Creating urban spaces for the weak, such as women, children and the elderly.
	Housing stability	It means that there is a living space within the city where everyone living in one city can live.
Social and economic inclusiveness	Participation promotion	It means being given the ability to participate in all activities, such as political decision-making, education, and society and culture provided by the city.
	Promoting interdependence	It includes contents such as the formation of a mutually beneficial network among urban residents and activation of communities.

3. Establishment of planning elements to enhance the characteristics and spatial inclusiveness

3.1 Character of Gamcheon port

Port cities can be divided into a port space for performing port-related functions and a port hinterland area for residential and commercial functions. Also, the port space has the characteristics of being connected in the hinterland by railroad or road transport systems reasons and its functional characteristics. Railroads and roads have the characteristic of dividing the space into left/right or

top/bottom without intersections in terms of shape characteristics. These morphological characteristics naturally separate spaces, resulting in further social separation.



Fig. 1 Site of research, Gam-cheon Port

Currently, Busan Port includes South Port, North Port, Gamcheon Port, Dadae Port, and New Port. Among them, Gamcheon Port as show in Fig. 1, has a large number of aging residential areas in the hinterland, and the function of the port space itself is very declining. The urban regeneration plan, which is somewhat far from solving the fundamental problem of the decline, has been applied, and the locality of the corresponding space is rather ambiguous as show in Fig. 2. In addition, as Russian nationals who recently entered the country through Gamcheon Port are infected with Covid-19, it is an urgent situation to secure the safety of residents in the surrounding residential areas.



Fig. 2 Status of the residential areas behind Gamcheon Port

3.2 Building planning elements to promote spatial inclusiveness

In this section, planning elements have been derived to improve space inclusion. One of the philosophical contents of inclusion is 'right'. The key here is the concept of 'spatial rights' rather than general rights such as human rights, citizenship, and the right to seek happiness. This concept is based on Henri Lefebvre's 1968 book "Right to the City" in *Le Droit a la ville*. Lefevre understood the city as a political and spatial concept and argued that everyone in the city

had the right to enjoy the conveniences it offers, to participate in city politics and administration, and to create a city.

This concept was later inherited and spread in a broader sense by many intellectuals such as David Harvey, and the consensus has broadened enough to be reviewed on the agenda of the UN-Habitat III in 2016. Based on the indicators of spatial inclusion that emerged in the background as described above, planning element for enhancing spatial inclusion were derived.

Therefore, in this study, in order to derive all the elements necessary for the creation of an inclusive city, concepts similar to those of the inclusive city and related literature were reviewed, and the planning elements were selected by excluding duplicate items. Because it is somewhat broad and has limitations in which many planning elements cannot be applied, it used factor analysis (principal component analysis) for experts in the urban-related field based on the question asking the importance of the pre-selected planning elements. Abbreviated based on the 0.5 factor loading of 23 variables used after the Verimax rotation.²⁾ Based on the considerations of previous studies as described in table Table3, FGI (Intensive Group Interview) was conducted to finally derive planning elements as shown in Table 4.

2) From January 15, 2020 to February 2, 2020. A total of 100 copies were distributed and 95 copies were collected.

Table 3 Planning elements for promoting spatial inclusion (primary selection)

Planning elements for promoting spatial inclusiveness		References								
		A	B	C	D	E	F	G	H	I
Universality and stability of space	1. Securing the convenience and safety of public transportation facilities	*			*	*	*			
	2. Public transportation-oriented transportation system	*						*		
	3. Design with road separation applied	*				*	*			
	4. Pedestrian-centered road system	*			*			*		
	5. Securing pedestrian safety with elementary schools and child protection zones	*								*
	6. Establishing a pedestrian crossing signal system considering the walking speed of the transportation vulnerable	*		*		*				
	7. Arrangement of roadside environment to secure visibility									*
	8. Pedestrian-oriented street light installation and proper illumination selection									*
	9. Securing safety through traffic calming techniques	*					*			
	10. Public space design in city with barrier-free technique	*		*					*	
	11. Installation of facilities and flooring considering the visually impaired								*	*
	12. Creating a space for the socially weak in the park	*							*	*
	13. Creation of unshielded green space	*		*						*
Residential safety	14. Supply of residential areas by various prices						*	*		
	15. Preparation of improvement measures for aged housing						*			
	16. Establishment of elderly-friendly apartment houses				*		*			
	17. Urban disaster prevention system (seismic design, etc.) in middle and low-income residential complexes					*				
	18. Crime Prevention Environmental Design (CPTED) application in consideration of securing safety in middle and low-income residential complexes						*			*
	19. Establishment of welfare infrastructure within a short distance from middle and low-income residential complexes (eg, leisure/care facilities)				*					
	20. Securing access to middle- and low-income residential complexes, parks, green areas, and waterfronts (rivers, lakes)						*			
	21. Securing access to middle and low-income residential complexes, public facilities, and neighborhood living facilities						*	*		
	22. Securing accessibility to public transportation						*	*		
	23. Arrangement to facilitate interaction or interaction between neighbors									*

A. Ohe(2012) B. Che(2013) C.Minh(2009) D. Kim(2014) E. Song(2012) F.Lee(2011) G.Lee(2011) H.Ohe(2015) I. Lee(2008)

Table 4 Inclusive city planning elements

Division	Contents
Safety of Public space	<ol style="list-style-type: none"> 1. Install pedestrian-oriented street lights and select appropriate illumination 2. Creation of unshielded green space 3. Arrangement of roadside environment to ensure possible surveillance and visibility 4. Installation of facilities and flooring for the visually impaired 5. Securing safety through traffic calming techniques
Pedestrian and traffic safety	<ol style="list-style-type: none"> 1. Pedestrian-centered road system 2. Securing pedestrian safety with elementary school and child protection zones 3. Establish a crosswalk signal system that considers the walking speed of the transportation vulnerable 4. Design with road separation applied 5. Securing the convenience and safety of public transportation facilities 6. Public transportation-oriented transportation system
Residential safety	<ol style="list-style-type: none"> 1. Urban disaster prevention system in middle and low-income residential complexes 2. Application of CPTED to secure safety in middle and low-income residential complexes 3. Securing access to middle and low-income residential complexes, parks, green areas, and waterfront 4. Establishment of welfare infrastructure within a short distance from middle and low-income residential areas 5. Securing access to middle and low-income residential areas, public facilities, and neighborhood living facilities

4. Derivation of elements necessary to increase spatial inclusiveness in the port hinterland(PLS regression analysis)

In this section, satisfaction with the degree of need for improvement and supplementation was investigated and analyzed to enhance the inclusiveness of the Gamcheon Port hinterland among the spatially inclusive city planning elements previously derived. PLS regression analysis was used as the analysis method. PLS regression analysis is an analysis method similar to multiple regression analysis, but it can be viewed as a methodology for predicting the future rather than analyzing a specific influence relationship. In addition, unlike multiple regression analysis, it can solve the problem of multicollinearity between elements, and it is an analysis method that can be used even when the number of observations is not large.

The survey subjects required the opinions of experts, so 14 urban-related experts, 10 construction-related experts, and 8 port and marine-related experts were targeted. For data collection, a preliminary survey and this survey were conducted from April 6th to May 3rd, 2020.

4.1 PLS regression analysis result

(1) Analysis results of public space safety

Among the planning elements for improving inclusion, the need for detailed elements corresponding to 'public space safety' and satisfaction with the inclusiveness of the current Gamcheon Port hinterland are derived from a Likert scale value of 1 to 7 points, and PLS between the values. After performing regression analysis, the following results were derived in Table 5.

Since the number of potential factors corresponding to the starting point at which the Y variance value falls sharply shows the highest explanatory power, it can be seen that in public space safety, the highest explanatory power is expressed through two potential factors.

Table 5 Degree of explanation of variance in public space safety

Latent factors	statistic				
	x variance	Cumulative x variance	Y variance	Cumulative Y variance (R-squared)	Modified R-squared
1	.456	.456	.066	.066	.047
2	.224	.680	.076	.142	.106
3	.151	.832	.023	.166	.111
4	.055	.886	.013	.179	.106
5	.114	1.000	1.252	.179	.086

Accordingly, it was possible to derive elements necessary for public space safety as follows based on a value of 1.2 or higher, a VIP value of “very important,” among the two potential factors as described in Table 6.

Table 6 Results of PLS regression analysis on public space safety

Variable	parameter	Latent factor				
		1	2	3	4	5
Constant	2.266					
A1	-.417	.698	1.863	1.772	1.727	1.727
A2	.441	1.793	1.752	1.709	1.647	1.647
A3	.095	.013	.433	.723	.736	.736
A4	.101	.640	.465	.474	.643	.643
A5	-.097	.942	.644	.693	.774	.774

$$y = 2.266 - 0.417X_1 + 0.441X_2 + 0.095X_3 + 0.101X_4 - 0.097X_5$$

X_1 = Pedestrian-oriented street light installation and proper illumination selection

X_2 = Avoid concealing space when planning green area

X_3 = Arrangement of roadside environment for surveillance functionality and visibility

X_4 = Installation of facilities and flooring for the visually impaired

X_5 = Securing safety through traffic calming techniques

(2) Analysis results on pedestrian and traffic safety

Among the planning elements for enhancing inclusiveness, the need for detailed factors corresponding to ‘pedestrian and traffic safety’ and satisfaction with the

inclusiveness of the current Gamcheon Port hinterland are derived from a Likert scale value of 1 to 7 points. After conducting the PLS regression analysis, the following results were derived in Table 7.

Table 7 Degree of explanation of variance on pedestrian and traffic safety

Latent factors	statistic				
	x variance	Cumulative x variance	Y variance	Cumulative Y variance (R-squared)	Modified R-squared
1	.533	.533	.116	.116	.096
2	.171	.705	.108	.224	.188
3	.147	.852	.043	.267	.214
4	.054	.906	.009	.275	.205
5	.060	.966	.003	.279	.188

Since the number of potential factors corresponding to the starting point at which the Y variance value falls sharply shows the highest explanatory power, it was found that in terms of pedestrian and traffic safety, the highest explanatory power was expressed through two potential factors. Accordingly, it was possible to derive elements necessary for public space safety as follows based on a value of 1.2 or higher, a VIP value of “very important,” among the two potential factors. as described in Table 8.

Table 8 Results of PLS regression analysis on pedestrian and traffic safety

Variable	parameter	Latent factor				
		1	2	3	4	5
Constant	.361					
B1	.075	.864	.623	.576	.578	.598
B2	-.280	.148	1.127	1.073	1.060	1.056
B3	.353	1.623	1.559	1.667	1.641	1.637
B4	-.073	.212	.873	.800	.811	.807
B5	-.301	.734	.594	1.006	1.014	1.023
B6	.459	1.420	1.234	1.131	1.154	1.160

$$y = 0.361 + 0.075X_1 - 0.280X_2 + 0.353X_3 - 0.073X_4 - 0.301X_5 + 0.459X_6$$

- X_1 = Pedestrian-centered road system
- X_2 = Securing pedestrian safety with elementary schools and child protection zones
- X_3 = Establishment of a crosswalk signal system considering the walking speed of the transportation vulnerable
- X_4 = Design with road separation applied
- X_5 = Securing the convenience and safety of public transportation facilities
- X_6 =Transportation system centered on public transportation

Table 10 Results of PLS regression analysis of residential safety

Variable	Parameter	Latent factor				
		1	2	3	4	5
Constant	1.185					
C1	.190	1.089	1.026	1.025	1.017	1.017
C2	-.146	.697	1.257	1.224	1.241	1.241
C3	-.007	.441	.518	.572	.579	.580
C4	.262	1.630	1.786	1.793	1.783	1.782
C5	-.315	1.205	2.318	2.236	2.251	2.251
C6	.025	.162	.375	.443	.444	.444

$$y = 1.185 + 0.190X_1 - 1.146X_2 - 0.007X_3 + 0.262X_4 - 0.315X_5 + 0.025X_6$$

(3) Analysis results of residential safety

Among the planning elements for improving inclusiveness, the need for detailed elements corresponding to 'residential safety' and the satisfaction of the inclusiveness of the current Gamcheon Port hinterland are derived from a Likert scale value of 1 to 7 points, and PLS regression between the values. After performing the analysis, the following results were derived in Table 9.

Table 9 Degree of explanation of variance of residential safety

Latent factors	statistic				
	x variance	Cumulative x variance	Y variance	Cumulative Y variance(R-squared)	Modified R-squared
1	.243	.243	.073	.073	.058
2	.286	.529	.048	.121	.093
3	.219	.748	.007	.128	.085
4	.148	.896	.002	.130	.071
5	.045	.941	8.428E-5	.130	.055

Since the number of potential factors corresponding to the starting point at which the Y variance value falls sharply shows the highest explanatory power, it was found that in terms of pedestrian and traffic safety, the highest explanatory power was expressed through two potential factors. Accordingly, it was possible to derive elements necessary for public space safety as follows based on a value of 1.2 or higher, a VIP value of "very important," among the two potential factors like as described in Table 10.

- X_1 = Urban disaster prevention system in middle and low-income residential complexes
- X_2 =CPTED application to secure safety in middle and low-income residential complexes
- X_3 =Securing access to middle and low-income residential complexes, parks, green areas, and waterfront
- X_4 =Establishment of welfare infrastructure within a short distance from middle and low-income residential complexes
- X_5 = Securing access to middle and low-income residential complexes, public facilities, and neighborhood living facilities
- X_6 = Expansion and activation of public and educational facilities

As a result of the above analysis, it was found that for the safety of public spaces, 1) installing streetlights centered on pedestrians and selecting appropriate illumination, and 2) avoiding concealed spaces when planning green areas.

In addition, for pedestrian and traffic safety, the need for 1)the establishment of a crosswalk signal system that considers the walking speed of the transportation vulnerable, 2) a traffic system centered on public transportation is high.

It was found that there is a high need to 1)apply CPTED to secure safety in residential complexes, 2) build welfare infrastructure within a short distance from middle and low-income residential areas, and 3) secure access to middle and low-income residential areas, public facilities, and neighborhood living facilities. On the other hand, the explanatory power of the model for each major

classification planning element through PLS regression analysis was not high at 10.6%, 18.8%, and 12.4%, respectively. However, PLS regression analysis is not meaningful in deriving the exact influence relationship between each factor numerically, but rather useful in predicting future changes in urban space, so even a model with a somewhat low explanatory power is currently relevant.

4.2 Suggestion of urban design directions to enhance spatial inclusion in the port hinterland

Based on the above analysis results, the urban design elements corresponding to enhancing inclusion, among urban design elements are derived as follows : (1) Public space safety, (2) Pedestrian and traffic personnel, and (3) Residential safety as described in Table 11.

Table 11 Derivation of urban design elements that correspond to planning elements to increase inclusiveness

Division	Detail planning elements	Urban design elements
Public space safety	Pedestrian-centered street light installation and proper illumination selection	Street light design and installation spacing
	Avoid concealing space when planning green areas	-Layout plan by type of park and green area -Layout and scale of parks and green spaces by living area -Give the park type and character -Living area parks and theme parks
Pedestrian and traffic safety	Establishment of a pedestrian crossing signal system considering the transportation vulnerable	-Material and height of the curb -Plan of effective width of sidewalk and obstacle area
	Public transportation-oriented transportation	-Lane number and lane width -Bicycle road installation section and width

	system	-Parking and cargo loading
Residential safety	CPTED application to secure safety	Streetlight design and installation interval
	Building welfare infrastructure	Layout and scale of parks and green spaces by living area
	Securing accessibility to public facilities and neighborhood living facilities	Effective width of the sidewalk

Based on the above detailed urban design elements, the directions for urban design to enhance spatial inclusiveness in the Gamcheon port hinterland are presented as follows.

(1) Public space safety

At present, the hinterland of Gamcheon Port has a high slope and a very high density. There are currently no facilities in which narrow and high pedestrian spaces can be felt safely. Therefore, it was judged that it was necessary to install streetlights, one of the most basic safety facilities, in order to secure crime and safety in pedestrian spaces as illustrated in Fig. 3.

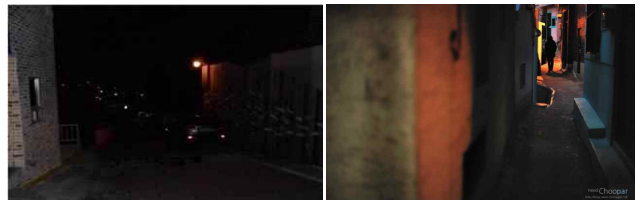


Fig. 3 Dark alleyways-Hinterland of Gamcheon port

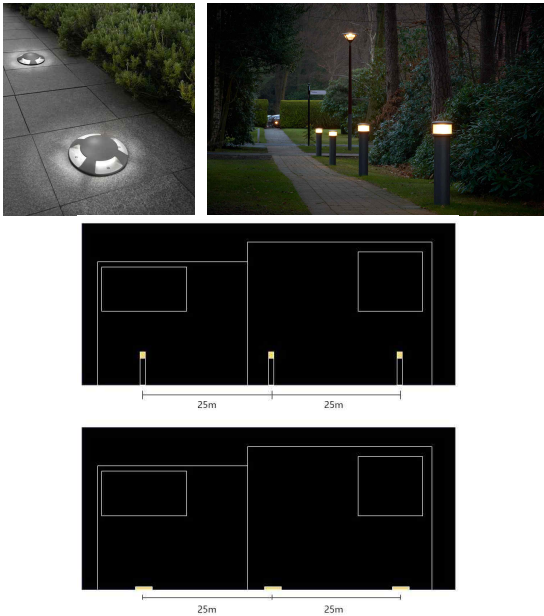


Fig. 4 Installation of pedestrian-oriented street lights

In addition, the narrowest alleyway in the residential area was only 90cm, and when the streetlights in the pedestrian space were lit, light was transmitted through the residential area, causing inconvenience.

First, we propose to install streetlights according to the building regulations that stipulate that the distance between streetlights is 25m. According to building codes, the horizontal illumination of pedestrians in residential areas with low traffic is 3lx and the vertical illumination is 0.5. In addition, it is proposed to install a lower street light instead of the upper light in order to compensate for the disadvantage of transmitting light into the house when the upper light is installed in a narrow alley as illustrated in Fig. 4.

Second, it is proposed to create a green space without concealed space. Green spaces and public spaces have the effect of reducing crime rates by monitoring through the eyes of a third party, and they can be used as community spaces within the region, so the need for a small park is high. Currently, there are no green spaces and public spaces in the area. Therefore, it is expected that if public spaces and green areas are created, it will have a positive effect on improving inclusion in the lives of residents. <Fig. 5>

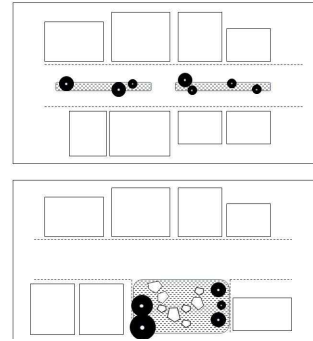


Fig. 5 Park without concealed space

Third, It is a place where many tourists are constantly taking steps under the concept urban regeneration. As a result, residents who actually live are often infringed on their privacy rights, and they are suffering a lot from noise. Therefore, this study suggests that a small park should be arranged, but it should be located in a location that does not interfere with the lives of residents. A security facility such as CCTV in the park was also installed, so that the park that should serve as a shelter for residents is rather a crime. I would like to propose a design that does not become a rent as show in Fig. 6.



Fig. 6 Green space without concealed space

(2) Pedestrian and traffic safety

In modern society, the importance of the right to walk is increasing. In particular, the right to walk is one of the most important social problems, and there are many areas that cannot be solved only by individual efforts. For people with physical discomfort, the right to walk needs more social support (Kang, 2012), and a more detailed design approach is needed in places where access is difficult, such as a ramp like the subject of this study. Moreover, the proportion of the elderly population in Saha-gu, which is located in the residential area behind Gamcheon Port, is 9.8% as of 2018, which is considered one of the areas with

a high proportion of elderly people in Busan.(Source: Busan Metropolitan City website)

Therefore, it is urgent to prepare urban design guidelines to secure pedestrian and traffic safety.

First, since there is a risk of slipping in the case of a slope, it is suggested to secure safety by using a material with friction or a material having strong water permeability as show in Fig. 7.

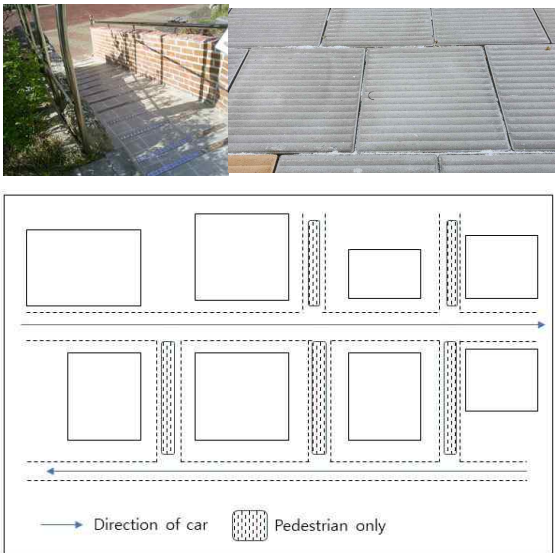


Fig. 7 Selection of materials to enhance pedestrian space safety

Second, it is proposed that the inside of the Gamcheon Port hinterland, which is composed of two lanes of maximum length overall, is converted to a one-way traffic type to secure a pedestrian space, and that the traffic lines of vehicles and pedestrians do not overlap as much as possible. In addition, it is proposed to secure the safety of pedestrians by minimizing vehicle entry into the alleyway.

Third, it is proposed to introduce a shuttle bus to secure routes for people with disabilities and residents to use. Public transportation routes are secured within the study site, but access is not easy. Accordingly, it is considered that it is necessary to expand public transportation routes to increase the inclusiveness of the lives of residents.

In the case of the hinterland of Gamcheon Port, the problem is most prominent due to the steep or dense residential areas and narrow pedestrian spaces. However, this has many limitations in mitigating the problem only by approaching urban design, and it is judged that the traffic plan needs to be reflected in order to secure pedestrian and traffic safety.

(3) Residential safety

The original residence is a space that must ensure comfort and convenience as well as safety. However, the residential area in the hinterland of the port of Gamcheon Port was used as a temporary shelter for refugees during the war, and has remained as a residential area to the present. Therefore, unlike planned and developed residential areas, safety, comfort, and convenience are somewhat inadequate. Urban design elements that can be applied to improve inclusion derived from the results of the survey can be summarized as installing streetlights to secure CPTED, green spaces, and pedestrian spaces as illustrated in Fig. 8.

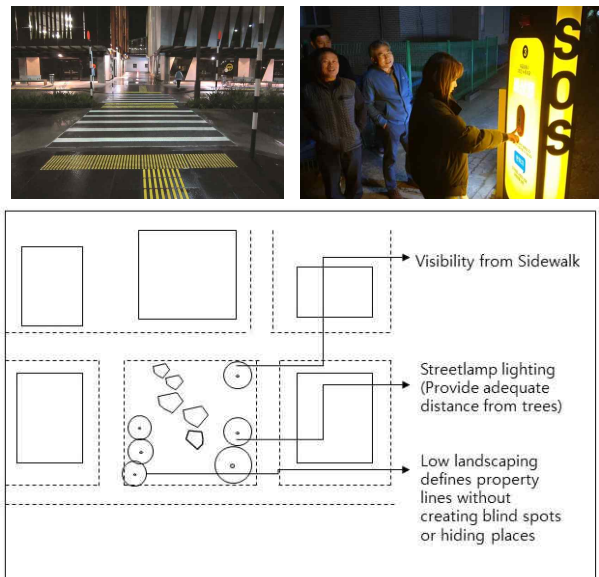


Fig. 8 Propose urban design to secure pedestrian and traffic safety

Accordingly, urban design directions for securing residential areas are: first, introduction of CPTED facilities necessary for the region, second, blind spot avoidance through securing green areas and parks, and third, security of pedestrians and residents through securing and managing pedestrians.

CPTED facilities are related to criminal safety and are very extensive, from streetlights to sirens, traffic signals, braille blocks, and pedestrian safety facilities for vulnerable groups. However, installation of street lights, one of the most basic elements of this research site, is urgent. Green spaces and parks are also facilities related to crime safety, but there is a possibility that they will be transformed into crime zones. Therefore, it is necessary to

establish a place where people pass frequently. Finally, securing a pedestrian space is also a very important right for modern people. Since it is a harbor hinterland, it is suggested to plan a promenade or footpath with a view of the sea to secure a space where residents and tourists can walk more safely.

5. Conclusion

Based on the concept of an inclusive city, this study suggested the direction of urban design to enhance spatial inclusion in the port hinterland.

First, through consideration of prior research related to inclusive city, planning elements for enhancing spatial inclusiveness were first derived, and the elements were abbreviated through factor analysis, and FGI was once again conducted for experts related to urban planning to plan elements of inclusive city. Was built. Afterwards, based on this, PLS regression analysis was conducted to investigate and analyze satisfaction with the elements necessary for enhancing spatial inclusion.

As a result, the installation of street lights and parks to secure the safety of public spaces, securing pedestrian spaces for the traffic-poor, expanding public transport routes, and installing CPTED facilities and public facilities and parks to secure residential safety was required, and finally, urban design direction was suggested based on this.

The city is constantly growing, but there are also places behind it that inevitably deteriorate. This phenomenon may go beyond spatial separation and become the starting point of social separation. Therefore, a more systematic and practical urban design process is necessary so that all people can enjoy their rights equally within the space of the city.

In particular, in port cities, the port space and the port hinterland play a role as an important gateway to determine the country's first image. Therefore, it is necessary to create an environment in which the characteristics of port spaces are emphasized and sustainable growth. Just wearing colorful clothes does not create culture. (Park, 2009) It is necessary to think more carefully about what can highlight the uniqueness and characteristics of 'the place' and what needs to be supplemented. The improvement of the living environment of the residents in the region should be given priority. Above all, it is judged that a development action that considers the uniqueness, historicity, and location of a port

city with strong environmental, geographic, and landscape characteristics unlike other regions is necessary.

This study was carried out with the purpose of suggesting urban design directions for enhancing inclusion in the port hinterland. The design direction suggested in this study may be very simple and simple. However, it is meaningful in that it reflects the opinions of residents and experts to come up with an alternative. Based on this study, if research on disaster prevention plans to secure disaster safety in the harbor hinterland in the future is also promoted, it is believed that it will be a stepping stone to create a more three-dimensional port space and port hinterland.

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