



The Development of the Combination Model between Social Welfare Facilities and New-Hanok-Style Public Buildings by Types

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ABSTRACT

Purpose: The purpose of conducting this study was to develop a model for combining the existing types of social welfare facilities and the newly developed types of new-Hanok-style public buildings. This model will be used as the foundation when planning the construction of individual new-Hanok-style social welfare facilities. **Method:** First, the theoretical basis was determined through consideration of the concept and characteristics of new-Hanok-style public buildings and the characteristics of social welfare facilities. Second, the considerations for applying new-Hanok-style elements to social welfare facilities with various characteristics were determined. Third, we proposed a combination model of new-Hanok-style social welfare facilities by searching for ways to apply the various structure types of new-Hanok-style public buildings to various types of social welfare facilities. **Result:** The new-Hanok-style combined model of social welfare facilities was divided into the wood-structure-alone type, wood-structure-village type, complex-structure-juxtaposition-parallel-high-rise type, complex-structure-juxtaposition-stacked stratification type, and composite-structure-fusion type. The results can be used as a reference when planning future social welfare facilities, with the application examples of representative types of social welfare facilities analyzed in this study serving as a reference.

KEYWORD

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1. Introduction

1.1. Research background and purpose

Recently, with the increasing interest of local communities in social welfare and culture, policies such as the “living SOC complexity project for dissemination and activation of social welfare facilities” are being promoted. In the early days of modern social welfare efforts, social welfare facilities were mainly used to provide accommodations to separate vulnerable groups from society, but recently, as welfare needs have become more diverse, the segmentation of facility types and a quantitative increase in facilities are taking place[1]. As the level of welfare needs increases along with the quantitative increase in facilities, an effort is being made to realize the social value of these buildings and their cultural role in communities. Therefore, social welfare facilities are becoming required to serve as public buildings that can enhance the pride of local community members by expressing national and regional identities and increasing the dignity of their surroundings. In response to these social demands, phase three of the Development of Modernized Hanok Technology project involves developing and establishing a new-Hanok-style social welfare facility model as a test case with the aim of improving

national pride through the promotion of Hanok-style architecture. Through this initiative, it is expected that revitalizing and increasing the presence of new-Hanok-style social welfare facilities will improve the convenience and safety of buildings by integrating modern technology with the lineage (DNA) of traditional Hanok architecture. However, the application of new-Hanok-style architecture to social welfare facilities is still limited to senior-citizen and daycare centers. Social welfare facilities are subdivided into various types; thus, basic data that can be referenced for each type is required when planning a new-Hanok-style facility.

The purpose of conducting this study is to present a combination model of social welfare facilities and new-Hanok-style public buildings that can be utilized as a foundation when planning individual new-Hanok-style social welfare facilities in the future.

1.2. Research method and scope

To develop a combined model for each type of new-Hanok-style social welfare facility, a theoretical basis was first determined through a review of the concept and characteristics of new-Hanok-style public buildings and the characteristics of each type of social welfare facility. Next, matters that needed to

be considered when applying new-Hanok-style elements to each type of social welfare facility were determined. Based on this foundation, a plan for applying the structural types of new-Hanok-style public buildings to each type of social welfare facility was sought, and a combined model for constructing new-Hanok-style public buildings was proposed.

This study presents a combination design model by limiting its analysis related to how new-Hanok-style public buildings and social welfare facilities can be integrated in terms of elements related to the structure, function, and beauty of the style. Since functional features, such as a building's interior, exterior, and amenities, that can directly affect the user environment of new-Hanok-style social welfare facilities need to be examined more closely in relation to each detailed type of social welfare facility covered in this study, they should be the subject of future studies. Furthermore, aesthetic matters were excluded from the scope of this study because consideration of the use and location of a space is the primary requirement during planning.

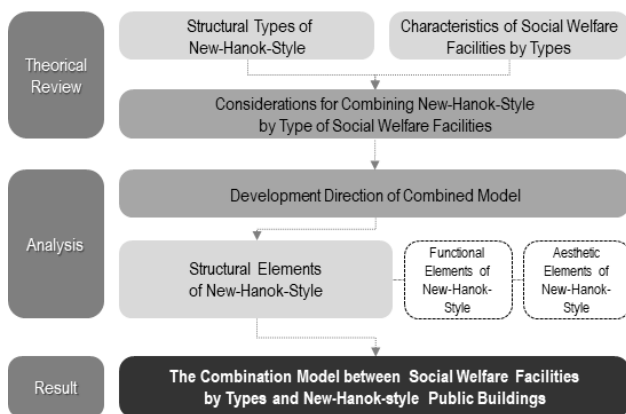


Fig. 1. Research Flow

2. Theoretical Review

2.1. Concept and types of new-Hanok-style public buildings

Regarding the research on new-Hanok-style public buildings, theoretical foundations, such as concepts and type classifications, were established through the study conducted in phase two of the Development of Modernized Hanok Technology project and in previous studies[2][3]. A “New-Hanok-style public building” is a building that reflects elements of planning and future-oriented design that have been inherited, developed, and creatively reinterpreted from the characteristics of Hanok architecture, including attached buildings and Korean-style outdoor spaces. This type of building particularly assumes the role of a public facility that promotes the welfare, cultural enrichment, and interconnectedness of residents and is closely related to their daily lives[2]. The scope of the “new-Hanok-style public building,” as

it is envisioned in this study, is a concept that differs from the “new Hanok”¹⁾ that belongs to the “Hanok architecture” prescribed by the Architectural Assets Promotion Act. The New-Hanok-style public building is a concept that excludes reinforced concrete structures that imitate the Hanok, modern Hanok,²⁾ and wooden Hanok styles in terms of shape alone (Fig. 2).[3].

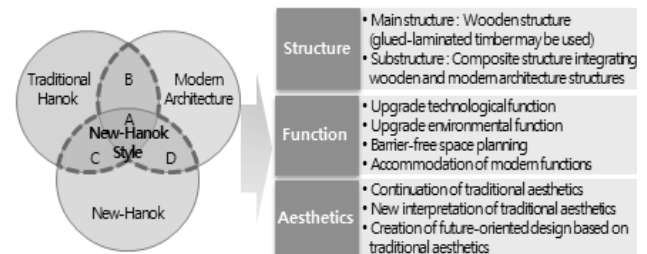


Fig. 2. Concept of New-Hanok-Style Public Building[3, Recite]

Park et al. (2015) classified new-Hanok-style public building types into the categories of “wooden structure,” “composite structure-convergence,” and “composite structure-juxtaposed.” Wooden structure is a type that maintains the shape and main structure of traditional Hanok architecture in a wooden form. Composite structure-convergence is a type that complements a space, which is difficult to create with only a wooden structure, with a modern one (RC/SRC). Composite structure-juxtaposed is a type that lends a traditional appearance to the entire building with minimal Hanok influences. It is a type that includes the juxtaposition of an independent wooden structure and a modern architectural structure without allowing them to interfere with each other. Additional details are shown in Table 1.[3].

Table 1. Characteristics of New-Hanok-Style Public Building Types

Type	Wooden structure	Composite structure - Convergence	Composite structure - Juxtaposed
Image			
Scale	<ul style="list-style-type: none"> Small Below ground level 2 	<ul style="list-style-type: none"> Medium or larger 1 basement level and 2 ground levels 	<ul style="list-style-type: none"> Medium or larger 2 basement levels and 3 ground levels
Composition	<ul style="list-style-type: none"> It is a single building or a large number of buildings gathered together to form the whole 	<ul style="list-style-type: none"> Internal space is differentiated in one building 	<ul style="list-style-type: none"> Internal space is differentiated in one building
Characteristic	<ul style="list-style-type: none"> Traditional Hanok Forms Reproduce the traditional aesthetic of Hanok 	<ul style="list-style-type: none"> Only the structure adopts the modern architectural structure, and the appearance of traditional Hanok Extending the architectural beauty of Hanok to a large space Traditional Giwa roof and facade Barrier-free space 	<ul style="list-style-type: none"> Independent Coexistence of Modern Architecture and Traditional Hanok with Modern Building and Hanok Emphasis on traditional beauty with minimal Hanok Barrier-free space

※ Rewritten by researchers based on research by Park, Jun-Young et al. (2015)[3]

The new-Hanok-style public building types were categorized based on structural elements, but, with reference to the composition method and characteristics, emphasis was placed on how the buildings are constructed. According to Park et al. (2015), the distinction between the composite structure-convergence and composite structure-juxtaposed types is somewhat ambiguous[2]. Therefore, in this study, an attempt is made to present a combined model that subdivides the types of new-Hanok-style public buildings based on an analysis of the characteristics of each type of social welfare facility. Although the classification system was based on new-Hanok-style public building types, the basic combination model of new-Hanok-style social welfare facilities was constructed by particularly focusing on the design qualities of the social welfare facility types.

2.2. Concept and types of social welfare facilities

A social welfare facility is a facility that is established to aid in carrying out a project to support the welfare of the socially disadvantaged in accordance with several acts, such as the Welfare of Senior Citizens Act, Child Welfare Act, and Single-Parent Family Support Act[1].

According to Kim et al. (2019), there are currently about 100 types of social welfare facilities in Korea, and the Ministry of Health and Welfare and the Ministry of Gender Equality and Family manage them, depending on the target population. Users of social welfare facilities include the elderly, children, infants, the disabled, the mentally ill, the homeless, women, families, multicultural groups, the youth, the general public, and low-income citizens. The various differentiated social welfare facilities can be categorized by type according to their main function, thus they are classified into “living-care,” “living-medical,” “using-leisure,” “using-education,” “using-work,” “using-medical,” “using-service,” “mix-use-using,” and “mix-used-complex”[1].

This study was conducted with the intent of proactively constructing a new-Hanok-style application model for each type of social welfare facility and devising an application plan for complex facilities to be used in the future.

3. Combined Model of Social Welfare Facilities and New-Hanok-Style Public Buildings by Type

3.1. Direction for planning of the combined model

Since there are various types of social welfare facilities that are differentiated according to their functions and users, an attempt was made to compose a new-Hanok-style application plan for each type of social welfare facility. In this study, when combining new-Hanok-style public buildings with social welfare facilities

by type, the classification of new-Hanok-style public building types was based on the study by Park (2015),³⁾ and the system and characteristics of social welfare facility types were determined by referencing the study by Kim (2019).⁴⁾ The spatial characteristics of social welfare facilities classified by type on the basis of previous studies and the installation standards for each facility were considered when constructing the model in this study.



Fig. 3. Concept of Combined Model of Social Welfare Facilities and New-Hanok-Style Public Buildings by Types

Regarding the requirements for each type of social welfare facility, a plan for the application of a new-Hanok-style model based on the results and tests conducted during phases one and two of the Development of Modernized Hanok Technology project, as well as new-Hanok-style building examples, was proposed. It includes a combinable model for the wooden structure, composite structure-juxtaposed, and composite structure-convergence types, which were derived from the study on the development of new-Hanok-style public buildings conducted in phase two of the Development of Modernized Hanok Technology project on the basis of considerations like building type and the specialized spaces of various types of social welfare facilities.

3.2. Considerations when integrating new-Hanok-style elements into various types of social welfare facilities

When considering social welfare facility and new-Hanok-style types, the characteristics of each social welfare facility type adopted from the study by Kim et al. (2019) and facility regulations⁵⁾ were examined. Based on these sources, the function, representative facility, building type, and specialized spaces of each type of social welfare facility were examined, and considerations for the combination of these elements with new-Hanok-style types were determined, as shown in Table 2.

For living facilities, various types of facility and installation standards may be applicable, depending on the number of people who must be accommodated. When the considerations for the application of new-Hanok-style elements to social welfare facilities according to type were determined, it was found that living facilities would require external linkage between the shape

Table 2. Considerations for planning New-Hanok-Style according to the space characteristics of each type of social welfare facility

Type	Function	Type of Representative Facility	Type of Building	Specialized space	Considerations for planning New-Hanok-Style
Living -Care	• Basic residential and care functions are provided to the users who need protection	Communal living homes	• House	-	• Structure Types by Housing Type • External connection plan of shared space
		Protected Residence Facility	• Apartment(Middle multigenerational)	• Encourage external linkage of cultural and sports facilities	
		Welfare housing	• Apartment(Hi rise)		
Living -Medical	• The purpose of treatment is to add the function of medical practice to the function of residential care facilities.	Medical communal living home	• House	-	• Structure Types by Housing Type • Outdoor space creation • Structural Types to Meet Fire Resistance Standards
		Protection and treatment facility	• Apartment(Middle multigenerational)	• Outdoor space recommended • Group activity room (shared space) • Hospitalization room: installed on the second floor or below(3 floors or more in case of fireproof structure)	
Using -Leisure	• Functions to support culture, sports activities, leisure activities, etc.	Hall for the aged	• Elderly child facility(Small) • Welfare facility	• Living room or lounge • Gender separation	• Type application by spatial function • Underground and large space installation
		Braille library	• Library	• Braille, printing, typing, recording studio	
		Athletic facility for the disabled	• Athletic facility	• Underground spaces such as swimming pools • Large space including multipurpose hall	
Using -Education	• Function to help return to society and adapt or to support education of children	Regional center for children	• Elderly child facility	• Office, Kitchen, dining room • Group guidance room	• Type suitable for small and low level • Provide psychological and emotional stability • External Space (Playground) Creation
		Day care center	• Elderly child facility(Small) • Welfare facility	• Outside playground • Care room recommended single floor	
Using -Work	• Function of work and vocational training to support economic activities	Protected Work space	• Factory	• Group activity room(Leisure, physical education, rehabilitation, etc.)	• Efficiency of plant installation • Shared space installation
		Work space			
Using -Medical	• Ability to support rehabilitation, treatment, etc. while living in home	Medical rehabilitation facility	• Elderly child facility	• Group activity and program room • Rehabilitation room	• Shared space installation
Mix-use -Using	• A facility with more than one combination of functions of a service facility	Welfare center	• Elderly child facility(Large)	• Large space, such as an auditorium	• Large space installation

of a building and shared spaces as well as the creation of an outdoor space. Thus, a combination pattern of the new-Hanok-style structural type in accordance with whether a building is a detached house or apartment needed to be identified. In addition, a solution to facilitate the external linkage of shared spaces and the creation of outdoor spaces was needed for a new-Hanok-style combined pattern.

Facilities are classified into leisure, education, work, medical, and agency-service types. Since small-sized facilities, such as a senior citizen center, and medium and large facilities, such as libraries and sports facilities for the disabled, fall into the using-leisure category, a plan for constructing new-Hanok-style structures that can accommodate the swimming pools of sports facilities was needed. Using-education facilities mainly include local children's centers and daycare centers where infants and toddlers can be cared for and educated. It is recommended that daycare centers have fewer than five floors, with an activity room located on the first floor and a playground outside. Using-work facilities are used as factories where the

underprivileged, such as the disabled, can work, and the minimum size is determined by the facility standards.⁶⁾ Using-medical facilities include long-term care hospitals, and, if a patient's room is located on third floor or higher, it is required be fire-resistant. Since wood is the primary material used to construct new-Hanok-style structures, the characteristics of this structure type should be applied according to applicable local regulations. An example of the agency-service type is a small-sized counseling center that is usually attached to another facility. Thus, it was excluded from this study. A representative facility of the mix-used-using type is a welfare center, which may be divided into a combination of a general welfare center, senior welfare center, and/or welfare center for the disabled, depending on the target users. A welfare center must accommodate large spaces, such as auditoriums, multi-purpose halls, and sports facilities. When the considerations for the application of new-Hanok-style elements to "using facilities" were determined, it was found that they included structure type/building scale, large space accommodation, external space

creation, shared space installation, and compliance with fire-resistance standards.

3.3. Combined pattern of new-Hanok-style structure types by social welfare facility type

The planning process of the combined model of social welfare facilities and new-Hanok-style public buildings by type is shown in Fig. 4. First, “building type” was identified by social welfare facility type. Next, a combined model of the social welfare facility and new-Hanok-style structure types was constructed by reflecting on the considerations for application of new-Hanok-style structural elements. Through this process, a combined

model of social welfare facilities and new-Hanok-style public buildings was determined according to type. Wooden structures were sub-divided into “stand-alone” and “village” types⁷⁾ and the composite structure-juxtaposed type was sub-divided into “parallel high-rise” and “layered middle story” types. Composite structure-convergence⁸⁾ conformed to the existing model without the need for additional sub-division; thus, five models were constructed.

Stand-alone wooden structures are suitable for small/ground-level buildings with two or fewer stories. Three-dimensional spaces can be established through height differences between an upper floor, main-floor room, attic, and parquet floors. Village-type wooden structures in which several wooden

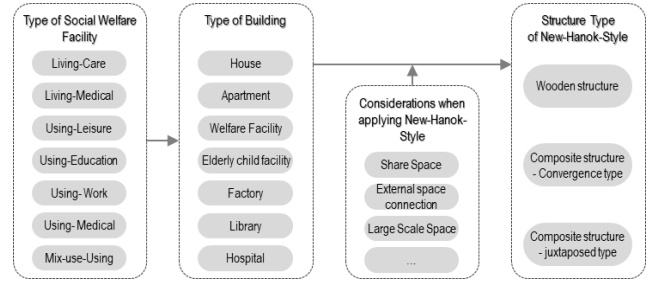


Fig. 4. Development Process of a New-Hanok-Style Public Building Combination Model by Type of Social Welfare Facility

structures are clustered are suitable when a large area is needed. The parallel high-rise variant of the composite structure-juxtaposed type can be utilized when the building’s capacity must be large, consisting of a combination of a modern high-rise building and a Korean-style wooden structure that can be used as a shared space. Regarding the layered middle story variant of the composite structure-juxtaposed type, the land area is narrow, and it is a type that can increase the efficiency of a large space or accommodate equipment installation on the lower level. The composite structure-convergence type looks like a traditional Hanok externally, but it provides structural stability and the conveniences of modern life through the addition of wood to a steel structure, resulting in a convergence structure. The combined patterns of new-Hanok-style public buildings for each type of social welfare facility established based on the description above are shown in Fig. 5.

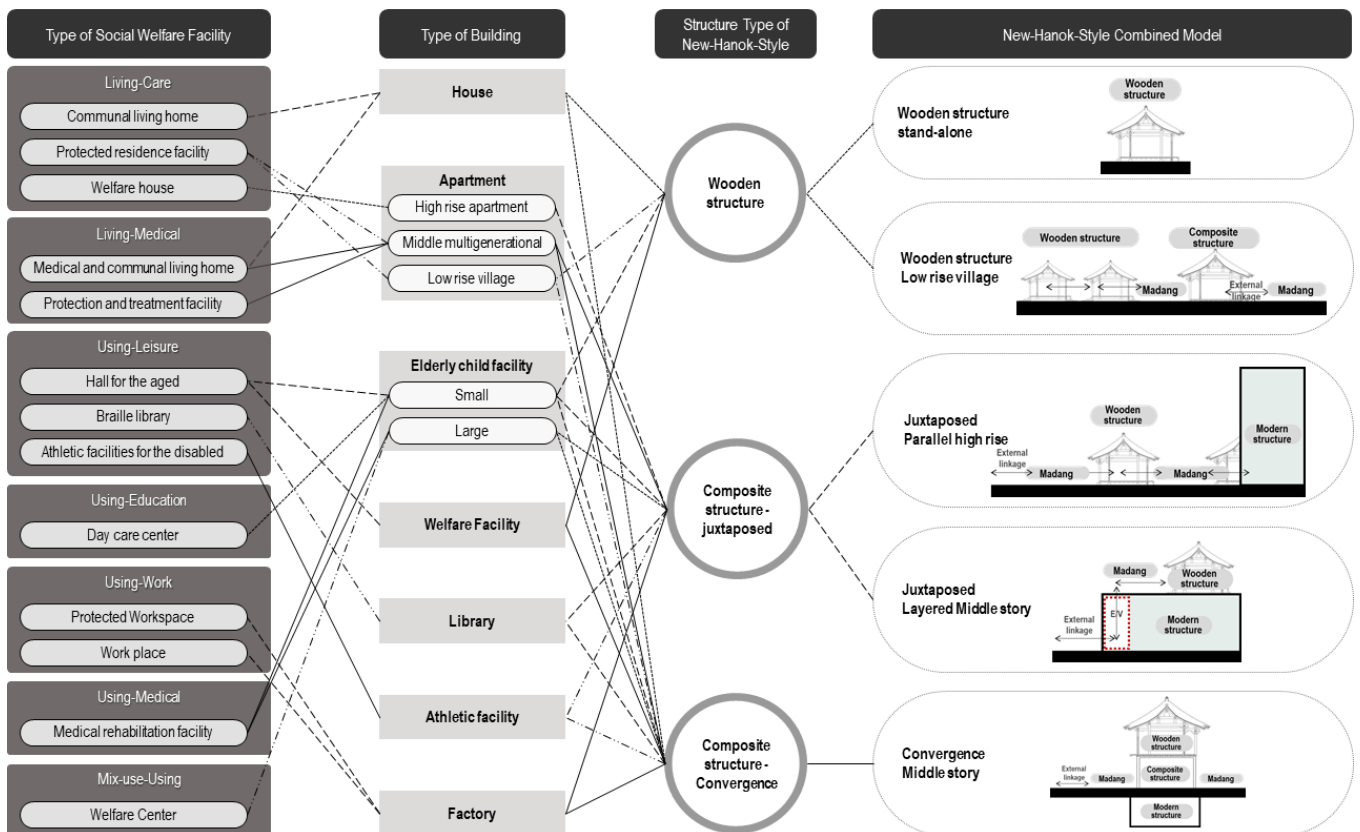


Fig. 5. Combined Patterns of New-Hanok-Style Structure Types by Social Welfare Facility

3.4. Characteristics of the combined model of new-Hanok-style public buildings and social welfare facilities by type

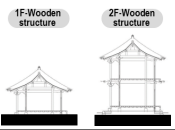
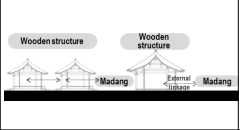
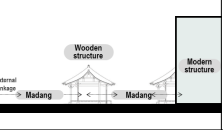
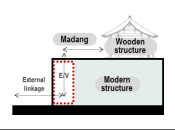
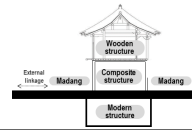





For the combined patterns described in Section 3.2, the requirements when applying them to social welfare facilities by type, application method, and characteristics were explored. Since the types of social welfare facilities are very diverse, this study contains an analysis of the characteristics of the combined model applied to representative facilities by type. Regarding the characteristics of the combined model, a possible model for combining these types with new-Hanok-style public buildings was proposed on the basis of the considerations mentioned above and examples of the corresponding conditions. Additional details are shown in Table 3, below.

Stand-alone wooden structures are suitable for a small communal living facility, and a combined pattern of low-rise village houses among multi-unit dwellings can be applied to protected residence facilities and medical facilities that occupy a large area. The juxtaposed type of composite structure can be sub-divided into a type in which high-rise apartments and Korean-style wooden structures are organized in parallel, as in the case of the Yeosu World of Ceramics,⁹⁾ and have a layered middle story in which the lower level consists of a modern

structure and the upper level consists of a Korean-style wooden structure. The convergence type of composite structure is suitable for middle-layered multi-family houses in which the basement and lower level are a modern architectural structure and the upper level is a Hanok-style wooden structure. Since protected residence and medical facilities require integrated protection and management of residents, the application of a composite structure-convergence type constructed as a single building is effective. In addition, it is necessary to ensure fire resistance by placing inpatient rooms and treatment spaces on a lower level with modern construction and shared spaces on an upper level with Hanok-style wooden construction when designing the layout of medical living facilities taller than three stories^{[4].¹⁰⁾}

The types of using facilities that can be used temporarily include the leisure, education, work, medical, and service types, as well as a comprehensive type in which more than two facilities are combined. Regarding wooden structures, senior citizen centers, which belong to the using-leisure category, and childcare facilities (daycare centers), which belong to the using-education one, can be constructed of eco-friendly wood, which enables users to experience traditional architecture. These types are small buildings in terms of scale. Accordingly, wooden structures are appropriate for these uses.¹¹⁾ The composite structure-

Table 3. Characteristics of the Combined Model of New-Hanok-Style Structure Types by Type of Social Welfare Facilities

Type	Wooden structure		Composite structure - Juxtaposed		Composite structure - Convergence
	Stand-alone	Village	Parallel high-rise	Layered Middle story	-
Diagram					
Case	 Sunchang day care center	 Gangneung Hanok village	 Yeosu pottery world	 Yeonggwang Livestock Research Institute	 Eunpyeong Hanok Village Center
LC	Facility	• Communal living homes	• Protected Residence Facility	• Welfare housing	• Protected Residence Facility
	Condition	• Small detached house type	• Secure large land area	• Capacity Large Scale	• Land area narrow • Capacity Medium
	Method	-	• Separation of Residential Building, Management Building, and Shared Building	• Residential space is a high-rise modern structure • Shared space is an independent wooden structure	• Residential space is low rise modern structure (F1~F3) • Shared space is upper wooden structure
	Characteristic	• Psychological and emotional aspects advantages	• Resident Independence • Management difficulties such as security	• Yard is used as a transition space for external linkage	• External connection between upper shared space and outdoor yard
LM	Facility	• Medical communal living home	×	×	• Protection and treatment facility
	Condition	• Small detached house type	-	-	• Abnormally large capacity
	Method	-	-	-	• Inpatient and medical space complex structure on the lower floor

Type		Wooden structure		Composite structure - Juxtaposed		Composite structure - Convergence
		Stand-alone	Village	Parallel high-rise	Layered Middle story	-
LM	Method	-	-	-	• Inpatient and shared space, wooden structure in the upper part	• Common Space: Wood Structure in the Upper Layer
	Characteristic	• Psychological and emotional aspects advantages	• Unsuitable for managing and treating dementia and severe patients	• Unsuitable for managing and treating dementia and severe patients	• Strengthening security including dementia patients by establishing a Korean outdoor yard on the upper floor • Separation of Medical Space and Living Space	• 1st floor outdoor courtyard (security required)
UL	Facility	• Hall for the aged	×	×	• Braille library • Athletic facility for the disabled	• Braille library • Athletic facility for the disabled
	Condition	• Small scale	-	-	• Medium-sized and above such as libraries for the disabled, sports facilities • Underground spaces such as swimming pools	• Medium-sized and above such as libraries for the disabled, sports facilities • Underground spaces such as swimming pools
	Method	• Male and female space division through separation	-	-	• Reading room is high-rise wooden structure • Modern structure of low level recording room, printing room, etc. • Swimming pool is modern underground	• Reading room is high-rise wooden structure • Modern structure of low level recording room, printing room, etc. • Swimming pool is modern underground
	Characteristic	• Psychological and emotional aspects advantages	• No assembly building required	• No skyscraper required	• Equipment installation efficiency	• Equipment installation efficiency is lower than composite-Juxtaposed structure
UE	Facility	• Day care center • Regional center for children	×	×	• Day care center	• Day care center
	Condition	• Apply to small single floor	-	-	• Large capacity • Plan for 5th floor or lower	• Large capacity
	Method	• Planning the yard as a traditional playground	-	-	• Elevator Hall Application • Planning the courtyard as a traditional playground	• Planning the courtyard as a traditional playground
	Characteristic	• Psychological and emotional aspects advantages	• No assembly building required	• No skyscraper required	• Care room recommended single floor • Upper floor traditional playground available	• Care room recommended single floor
UW	Facility	×	×	• Work space	• Protected Work space	×
	Condition	-	-	• Large numbers of people • Dormitory type available	• Fit non-dormitory type	-
	Method	-	-	• Shared space(group activity room) has a wooden structure • Dormitory and workshop have modern structure	• Shared space(group activity room) has upper wooden structure • Workshop modern low rise structure	-
	Characteristic	• Improper installation of factory equipment	• Improper installation of factory equipment			• Improper installation of factory equipment
UM	Facility	• Medical rehabilitation facility	×	×	• Medical rehabilitation facility	• Medical rehabilitation facility
	Condition	• Small capacity	-	-	• Medium or larger capacity	• Medium or larger capacity
	Method	• Male and female space division through separation	-	-	• Rehabilitation facility is low rise modern structure • Shared space is high rise wooden structure	• Rehabilitation facility is low rise modern structure • Shared space is high rise wooden structure
	Characteristic	• Psychological and emotional aspects advantages	• Unsuitable for patient care and treatment	• No skyscraper required	•	•
MU	Facility	×	×	×	• Welfare center	• Welfare center
	Condition	-	-	-	• Medium-scale abnormal welfare center	• Small welfare center
	Method	-	-	-	• Split buildings by purpose or function • Large structures such as auditoriums are modern, and program rooms are wooden.	• Adopt composite structure (steel frame + wood) when constructing large space such as auditorium
	Characteristic	• Inadequate scale	• Poor linkage between building functions	• No skyscraper required	• Large space configurable	• Large space configurable

* LC-Living Care, LM-Living Medical, UL-Using Leisure, UE-Using Education, UW-Using Work, UM-Using Medical, MU-Mix-use Using

juxtaposed style can be applied to welfare centers, which fall into the using-work and mix-used-using categories. Welfare centers, auditoriums, and multi-purpose halls that require large spaces can be constructed using modern building techniques, and program rooms requiring variable amounts of space can be constructed in the wooden Hanok style. Furthermore, in using-work facilities, dormitories and the group activity rooms of workshops can be housed in wooden structures, while the workplace can be housed in a modern structure. The composite structure-convergence type can be applied to medium-sized facilities such as libraries for the disabled and sports facilities, which are examples of using-leisure facilities. Regarding the reading room of a library for the disabled, employing Hanok-style construction methods for the upper level and modern ones for the lower level, which could include a recording room and publishing room, would be highly efficient. Moreover, the swimming pool of a sports facility could be housed underground inside a modern RC structure, while the upper level could be constructed as a Hanok-style wooden structure. This combination could be used when an underground space is needed in a using-education facility, but careful consideration would be required regarding dew condensation and infant mobility due to the nature of the underground space.¹²⁾ For using-work facilities, it would be appropriate to house dormitories and group activity rooms in an upper-level wooden structure and a workplace in a lower-level modern structure. However, there is a limit to how many people such a space could accommodate. In addition, since welfare centers, which are mix-used-using facilities, include large spaces, such as auditoriums and multi-purpose halls, wood could be added to a steel structure, an example of which is shown in the R&D technology applied to the composite structure-convergence construction of Eunpyeong Hanok Village Hall [5].¹³⁾

3.5. Pre-conclusion

It is possible to apply a new-Hanok-style construction method to each type of social welfare facility in accordance with its type, size (area and number of floors), and specialized space composition. While wooden construction imparts the traditional beauty of the Hanok style and is environmentally friendly, in the case of high-rise structures with three or more stories and large spaces, there is a legal limitation on its application; thus, the height and size of social welfare facilities must be considered. Therefore, for wooden structures, the use of wooden construction in high-rise multi-family houses, using-work facilities, and using-medical facilities would be inappropriate. Constructing high-rise spaces that include many rooms using

modern methods and constructing shared spaces of wood is efficient when building a composite structure-juxtaposed type of facility. Meeting fire resistance standards while satisfying the functional requirements of a space by using modern construction methods to build lower and underground levels and constructing the upper level as a wooden structure is required when constructing a composite structure-convergence facility.

Conclusion

This study contains an analysis of methods of combining social welfare facilities and new-Hanok-style public buildings according to type. To this end, the considerations involved in applying new-Hanok-style construction methods to facilities are derived from an analysis of the spatial characteristics of various types of social welfare facilities, with which new-Hanok-style structure types were combined. The results are as follows.

First, the elements that had to be considered when applying this style to facilities, such as building type, shared spaces, outdoor spaces, underground and large spaces, and facility uses, were determined by examining prior research and conducting a review of facility standards to determine the types of combinations of social welfare facilities and new-Hanok-style public buildings.

Second, the new-Hanok-style combined model for each type of social welfare facility was sub-divided into stand-alone wooden structures, village-type wooden structures, the parallel high-rise type of composite structure-juxtaposed structure, the layered-middle story type of composite structure-juxtaposed structure, and the composite structure-convergence type of structure. Through this classification system, an appropriate type of structure can be selected according to the type of social welfare facility when planning a new-Hanok-style social welfare facility. The system also provides basic data to facilitate conscientious design practices.

Third, the study contains an analysis of the patterns of the possible combinations of social welfare facilities and new-Hanok-style public buildings. The results can be used as reference data when planning a segmented social welfare facility in the future because they provide application examples for representative facilities of each type of social welfare facility analyzed in the study.

Because it only contains a basic overview of how to plan the construction of social welfare facilities using new-Hanok-style methods, the study is limited in its presentation of detailed models of various types of social welfare facilities. In addition, there is a possibility that considerations related to facility-specific functions or unique aesthetic aspects may have been overlooked when constructing the design models that were proposed in this

study. It is expected that various design models of new-Hanok-style social welfare facilities will be derived from those presented in this study. A study on the functional and aesthetic aspects of specific sub-categories of each type of social welfare facility considering their legal standards, uses, and user characteristics could be conducted in the future.

It is hoped that the quality of life of those who use social welfare facilities can be improved and that self-sustaining spaces can be created by considering the uses of a specific facility when planning the construction of a new-Hanok-style social welfare facility on the basis of the data in this study.

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Reference

- [1] 김영훈, 박준영, 조은길, 사회복지시설의 이용대상자별 유형분석 및 복합화 모델 연구, 한국: KIEAE Journal, Vol.19 No.3, 2019.06, pp.43-52. // (Kim, The Type Analysis and Mixed-use Model of Social Welfare Facilities according to the Users, Korea: KIEAE Journal, Vol.19 No.3, 2019.06, pp.43-52.)
 - [2] 한옥기술개발연구단, 한옥기술개발 2단계 최종보고서, 한국: 국토교통부, 2016.10, pp.36-52. // (Hanok Technology Development Institute, Hanok Technology Development Phase 2 Final Report, Korea: Ministry of Land, Infrastructure and Transport, 2016.10, pp.36-52.)
 - [3] Park Joon-Young, Kwon Hyuck-Sam, Cheong So-Yi, Bae Kang-Won, The Type setting and Application of the New-hanok type Public Buildings-Focused on Cases were completed after 2000, Korea: KIEAE Journal, Vol.15 No.5, 2015. pp.47-57.
 - [4] Noboru Yasui, Fire Safety Performance of Timber Building, Korea: 2019 Daejeon International Woodism-city Conference Book, 2019.10. pp.89-114.
 - [5] 김영훈, 한옥기술개발 2단계 신한옥형 공공건축물 실증구축 종합 분석, 한국: KIEAE Journal, Vol.18 No.4, 2018.08. pp.31-43. // (Kim Young-Hoon, Comprehensive Analysis of the Establishment Test of New Han-ok style Public Building in the 2nd Phase of Hanok Technology Development, Korea: KIEAE Journal, Vol.18 No.4, 2018.08. pp.31-43.)
 - [6] 박용구, 순창 금과어린이집, 한국: 대한건축사협회 월간 건축사, Vol.8, 2016, pp.44-57. // (Park Yong-Gu, Sunchang Kungwa day care center, Korea: Korea Institute of Registered Architects Monthly Journal, Vol.8, 2016, pp.44-57.)
- 1) When used to describe a building in which the main structure was built using Korea's traditional "wooden structure" method, this term refers to buildings and attached facilities that include modern technology and materials to improve the performance of the building.
 - 2) When referring to Hanok-style buildings built in the early modern period after the development of the traditional Hanok form, this term describes a Hanok-style building (urban Hanok) with a traditional Hanok form and a reduced size, which has been necessitated by the division of lots within cities in the process of urbanization, or Hanok-style buildings (improved Hanok) that have been modified from the traditional Hanok form.
 - 3) Park Joon-young (2015) established the concept of "new-Hanok-style" through several studies on the newly emerging types of Hanok including "Hanok-style," "new-Hanok," and "Hanok-look" for the first time and systematically classified the types of new-Hanok-style structures.
 - 4) Kim Young-hoon (2019) conducted a study that included systematized types of variously segmented social welfare facilities.
 - 5) Since the uses of the facilities corresponding to each type of social welfare facility may vary, there is a limit to generalizing and applying the new-Hanok-style elements described in this study. Accordingly, the results were designed to be used as basic data when planning each type of facility through the selection and analysis of representative facilities (for the elderly, disabled, and children).
 - 6) For sheltered workshops, the total area must be greater than 90m²; for workshops, it must be greater than 430m².
 - 7) According to Park Joon-young (2015), a wooden structure can be constructed as a single small building or as a cluster of several buildings. Accordingly, it was considered to have been constructed as a single unit with differentiation between buildings; in this study, a single structure and a set of aggregated types were sub-divided into separate categories.
 - 8) General buildings are classified into apartments (five or more stories) and townhouse/multiplex housing (four or fewer stories) according to the type of building for each purpose (article 3.5 of the Building Act). Based on such classification, in this study, those with two or fewer stories to which Korean-style wooden construction reflecting the characteristics of the Hanok style could be applied were excluded. The layered middle story type was defined as having three-four stories, and the high-rise type was defined as having five or more stories.
 - 9) The Yeosu World of Ceramics separates shared and individual spaces by juxtaposing a high-rise building with modern architecture that is used as an office with the wooden Hanok-style structure of the sales floor.
 - 10) In Japan, as one of the measures for ensuring the fire resistance of a wooden building, the lower part is constructed as of RC and the upper part is constructed of wood.
 - 11) By constructing the Sunchang Daycare Center, which was a test facility built during phase two of the Development of Modernized Hanok Technology project, of wood, the applicability of this method was verified[6].
 - 12) Although an underground space was planned for the Sunchang Daycare Center, which was a test facility built during phase two of the Development of Modernized Hanok Technology project, there was a problem related to insufficient utilization for safety reasons when accessing the attic using stairs as well as an environmental issue due to condensation.
 - 13) As a test facility built during phase two of the Hanok Technology Development project, its practicality was verified, as it was completed in 2016[5].