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A STUDY: Space Analysis in Apartments

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ABSTRACT

This study conducted a quantitative analysis of the number of water usage spaces and of the changes in their floor area ratio by using a space analysis program. The analysis results were then examined from a socio-cultural perspective to see how the water usage spaces, which had been linked to the outdoor space in the traditional Korean housing, affected changes in apartment house plans and subsequent changes in the housing culture, as they moved to the inside of the apartment house. It was found that water usage spaces greatly affected the entire unit floor plan of apartment housing, undergoing various changes in correlation with the changes in society and daily life.

Key words: Apartment, space analysis, unit plan, water-using area.

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Introduction

Background and Objective of the Study

Introduced in the early 1960s as a new type of dwelling, apartment houses became an important housing type in Korea, totaling 53% of the nation's entire housing units as of 2005. With the introduction of the apartment house, water usage spaces for cooking, hygiene, and laundry, which had been placed externally in the traditional Korean house, were brought inside the unit floor, and consequently, based on water usage spaces, new changes emerged in the use of housing space. Such changes went as far as to affect the daily living pattern and housing culture beyond merely a partial transformation of living space. Through an analysis of relations of water usage spaces in the apartment house unit floor and a quantitative and systematic probe into the changes in those relations, this study aims to understand how each water usage space has changed and developed in relation to each other. Such an understanding can be utilized in the floor plan development for low-energy, eco-friendly apartment houses currently under research and development, as well as, provide a direction for future housing planning.

Scope and Method of the Study

This study attempts to make a quantitative analysis of the way water usage spaces such as kitchen, bathroom, and utility room changed and evolved in relation to the unit floor plan of an apartment house. Water usage spaces were studied by selecting as study samples 2,292 unit floors with exclusive use area of 72 m^2 to 98 m^2 range from the data provided by domestic construction companies as of December 2005 on apartment complexes, each accommodating not fewer than 150 families.

In this study, the number of water usage spaces and their floor area ratio were found in accordance with each floor plan type by means of a quantitative analysis of water usage spaces in the unit floor of an apartment house. Based on the findings, the changes in composition and characteristics of water usage spaces were analyzed from the socio-cultural perspective.

Collection and Analysis of Quantitative Data

Since the floor plan type of an apartment house greatly affects the type of unit floor, the sample apartment houses were classified into three types of floor plan: stair-case type; single-loaded corridor type; and concentrated type. In addition, water usage spaces of an apartment house were divided into kitchen, bathroom, and utility room, and the collected samples were analyzed in terms of the number and the floor area ratio of water usage spaces.

Table 1 : The number of each floor plan type of the apartments

	Stair-case type	Single-loaded corridor type	Concentrated type
1970~1975	1	5	-
1976~1980	9	64	-
1981~1985	58	66	1
1986~1990	166	78	2
1991~1995	324	51	1
1996~2000	497	57	2
2001~2005	635	39	22
2006~2008	158	15	39
The total amount	1,848	375	67

Table 2 : The floor area ratio of water usage spaces of the each floor plan type of apartments

	Stair-case type			Single-loaded corridor type			Concentrated type		
	Bathroom	Kitchen	Utility room	Bath room	Kitchen	Utility room	Bath room	Kitchen	Utility room
1970~1975	4.24	10.75	1.97	3.58	8.39	0.82	-	-	-
1976~1980	4.29	7.85	1.08	3.68	9.89	1.28	-	-	-
1981~1985	3.33	8.78	0.94	3.39	9.70	0.84	2.92	8.71	2.30
1986~1990	4.17	9.37	0.56	3.46	10.33	0.74	3.63	8.88	0.78
1991~1995	4.71	10.50	0.18	4.42	11.03	0.68	5.70	7.92	1.02
1996~2000	4.60	10.77	0.18	4.59	10.59	0.58	3.94	7.00	2.70
2001~2005	4.83	9.73	0.42	5.10	9.79	0.08	5.14	8.29	0.66
2006~2008	5.12	8.99	0.43	5.27	9.67	0.00	5.60	8.66	0.17

Quantitative Data Analysis of Bathroom

The analysis of chronological trend in the number and the floor area ratio of bathroom points out that, starting from the mid-1980s, there were simultaneous changes in the trend of both analytic elements. The floor area ratio, which had gradually exhibited a downward tendency, began rising again, with 4.77% of the year 1985 as a turning point. As for the number of bathrooms per unit floor, two bathrooms also became prevalent circa 1985. From the beginning of the 2000s, the floor area ratio started increasing from the low 7% range, reaching 8.69% in 2007.

A look at the changes in floor plan type indicates that changes in the single-loaded corridor preceded those in the stair-case type. In terms of floor area ratio, the latter started to change in 1985 and 1999 as turning points, while changes occurred in the former in 1990 and 2001 as turning points. In the case of stair-case type, the numerical value of global integration dropped starting from 1988. In the single-loaded corridor type, however, numerical changes were not noticed until 1991. In terms of

floor area ratio, the concentrated type generally exceeded other types by 1% or higher, but became similar to the stair-case type from the mid-2000. In 2006 and 2007, on the contrary, it was the single-loaded corridor type that exceeded other types by 1%.

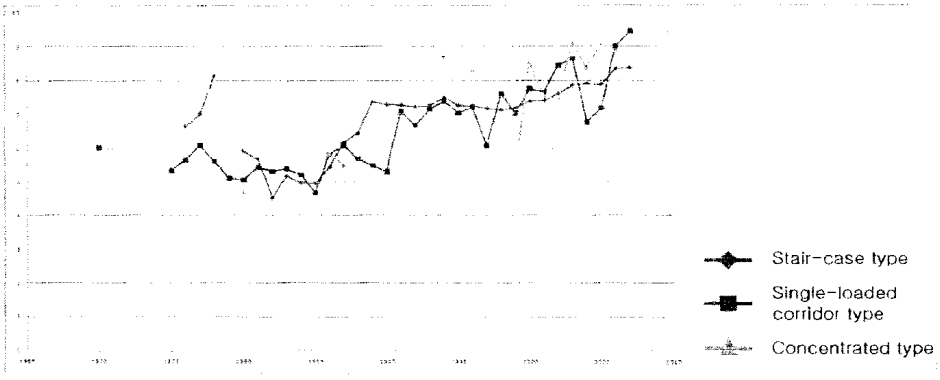

Figure 1 : The floor area ratio of Bathroom of the each floor plan type

Quantitative Data Analysis of Kitchen

The analysis of chronological trend in the kitchen quantity and floor area ratio data indicates that the floor area ratio had increased since 1970 and then from the late 1990s has been decreasing. Because the basic model apartment houses with exclusive use area of 72 m^2 to 98 m^2 range were selected as samples of the study, the number of kitchens was invariably one unit for all apartment types.

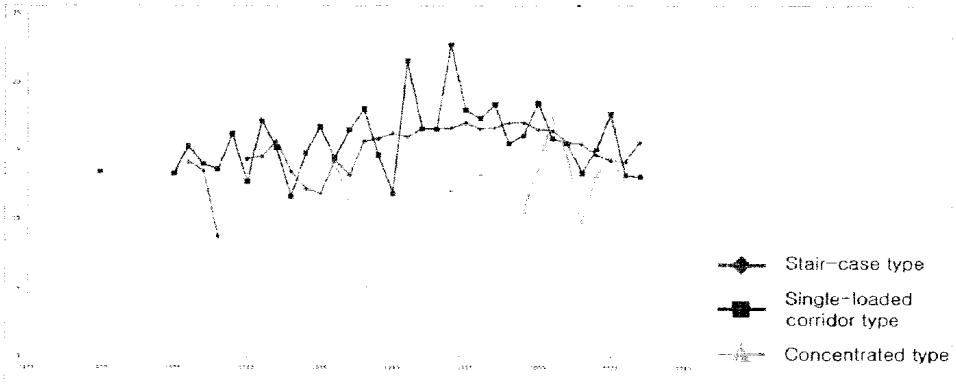

Figure 2 : The floor area ratio of Kitchen of the each floor plan type

Quantitative Data Analysis of Utility Room

The analysis of chronological trend in the utility room quantity and floor area ratio

data shows that the ratio of the number of utility rooms to the total number of apartment houses was noticeably diminishing. The floor area ratio is also found to have gradually dropped since the 1990s. A look at the changes in floor plan type indicates that the floor area ratio of the stair-case type and the single-loaded corridor type, although each showing similar level, gradually decreased. The concentrated type has consistently kept a utility room since 2000, while other types have removed it since mid-2000.

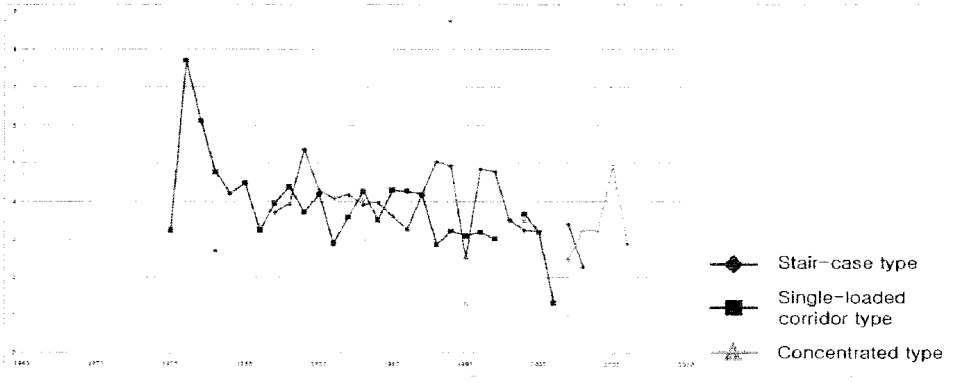

Figure 3 : The floor area ratio of Utility room of the each floor plan type

Comprehensive Analysis from Socio-Cultural Perspective

Comprehensive Analysis of Bathroom from Socio-Cultural Perspective

When apartment houses were first introduced, the bathroom, used as a laundry area and an auxiliary space for kitchen in addition to meeting physiological and hygienic needs, had a high floor area ratio of 5-6%. The newly planned utility room, however, started to take the place of the bathroom as an auxiliary space for kitchen. Even so, the bathroom area did not decrease greatly as laundry continued to take place in the bathroom. It, however, grew smaller, as the laundry function was transferred to the utility room with washing machines coming into wide use after mid-1980. Amid the rapid urbanization and the formation of nuclear family propelled by the low-birth rate policy in the 1970s and 1980s, which contributed to the establishment of couple-centered living culture, the wide use of mechanical ventilation systems made it possible to place a bathroom inside the unit floor. Since mid-1980, two bathrooms have thus become dominantly prevalent as extra bathroom for a couple's exclusive use started to appear.

A look at the bathroom in light of floor plan types shows that, as for changes in the area of bathroom, the stair-case type preceded the single-loaded corridor type because it adopted the planning of utility room earlier. The concentrated type shows a slightly

higher floor area ratio of bathroom than other types. The reason is that its comparatively diverse designs provided atypical remnant space used for bathroom or utility room. Since the 1990s, the planning of utility room has decreased, as the function of utility room transferred to rear balcony to which a low ratio is applied in the calculation of exclusive use area. With the demand for high-end bathroom growing as a result of economic development, there has been an increasing trend of enlarging bathrooms and planning a dressing room directly adjacent to it.

Table 3 : The number of planning a dressing room

1971 ~1975	1976 ~1980	1981 ~1985	1986 ~1990	1991 ~1995	1996 ~2000	2001	2002	2003	2004	2005	2006
-	-	-	2	1	4	18	30	43	42	48	58

Comprehensive Analysis of Kitchen from Socio-Cultural Perspective

In the 1960s and the 1970s, the period coinciding with the initial stage of apartment house development, features such as a drainage system and a sink were introduced to the kitchen. Back then, however, the kitchen existed as an independent space separated from the living room, because eating meals while sitting on the main bedroom or living room floor was preferred to eating at the dining table in the kitchen, which had a sunken floor. With the consumers' growing preference for open space plan, the kitchen, linked to the living room, started to feature strongly as the central domain of open living style, ceasing to be a mere space for cooking lacking spatial linkage. Until the mid-1990s, along with the living room, the kitchen increasingly became the central space of family life, as shown in the upward trend of its floor area ratio. Since the 2000s, the ratio has gradually diminished, due to the fact that an active use of the rear balcony as an auxiliary kitchen reduced the area of kitchen (Fig. 4).

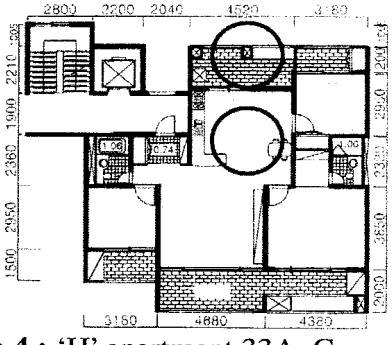

Figure 4 : 'H' apartment 33A, Gwangjang-dong

Comprehensive Analysis of Utility Room from Socio-Cultural Perspective

The utility room came into being as there was a need for an auxiliary kitchen with the introduction of apartment houses. In the initial stage, the utility room was included in

the majority of floor plans. However, the function of the utility room transposed to the rear balcony, thereby the ratio of its planning cases was reduced. With the onset of 2004, for example, the utility room disappeared from the stair-case and the single-loaded corridor types. In contrast, the concentrated type started to place the utility room and the bathroom in an atypical remnant space created in the planning process. (Fig. 5) Moreover, the utility room continued to appear in a number of floor plans where the rear balcony was absent. (Fig. 6)

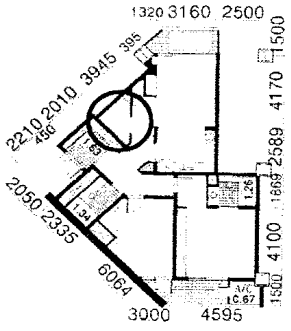

Figure. 5 : 'S' apartment 38B, dogok-dong, Gangnam-gu, Seoul (2003)

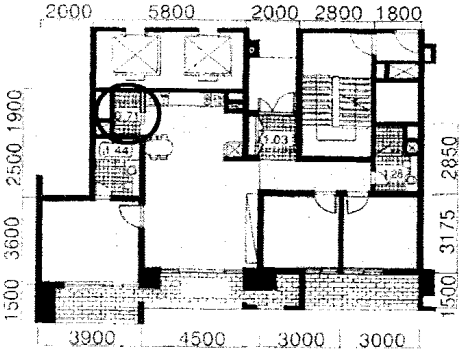

Figure 6 : 'S' apartment 32, shindaebang-dong Dongjak-gu, Seoul (2003)

Conclusion

The function and the meaning of apartment house unit floor as well as the type and the placement are changing in accordance with changes in socio-cultural milieu, housing culture and daily living patterns. Water usage spaces, which were linked externally in the Korean traditional housing, greatly affected the planning of unit floor as they became integrated into the inside of an apartment house.

The analysis of this study may be summarized as follows.

First, in the initial stage of apartment house development, the bathroom served as an auxiliary space for the kitchen in addition to its basic functions of meeting hygienic and physiological needs, but it started to carry out its primary functions solely as a utility room and the rear balcony gradually took its place as an auxiliary kitchen. Since the 1990s, with the growing concern for health, the bathroom has been transformed into a spacious place.

Second, the formation of nuclear family, brought about by economic development and social policies, led a family culture with the husband and wife as its center. As a result, the main bedroom, the central space of domestic living in the Korean traditional housing, became a private sleeping area for a couple and two bathrooms were set as the norm in the unit floor of an apartment house. Because of the increasing preference for open floor plan, it should also be pointed out the dining-kitchen, along with the living room, became the central domain of housing.

Third, the number of cases of unit floor with the utility room changed depending on the type of floor plan. The 1970s and 1980s, when the ratio of single-loaded corridor type was higher, witnessed a continuous planning of utility room; however, the cases of utility room planning began to dwindle, as the rear balcony, not included in the calculation of exclusive use area, took its place from the 1990s. In contrast, the planning of utility room continued in the concentrated type, in which atypical space or space difficult to plan a rear balcony turned up frequently.

As demonstrated in the above, undergoing a variety of changes in conjunction with those in society and daily living, water usage spaces greatly affect the entire unit floor plan of apartment houses. In this light, there is a need for giving a lot of thought to water usage spaces in the planning of an apartment house. It will be necessary to do follow-up studies that will analyze various sizes of apartment houses by adding more diverse analytical elements such as circulation distance and line of sight.

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