

Landscape Evaluation of High-Rise Apartments*

- Focusing on Grouped Features -

Lee, Bong-Soo, Graduate School of Chosun University

Yoo, Chang-Geun, Lecturer, Chosun University

Cho, Yong-Joon, Professor, Chosun University

Introduction

Since late 1980s, the rapid growth of population and the trend of nuclear families have caused serious housing shortages. The concentrated constructions of apartment complexes have continued with the political and financial support of the government. However, most the majority of them have been constructed in suburban areas in which large empty sites can be easily found. Unfortunately the houses built have many problems in quality. One of them is the distortion of the city landscape structure.

In developed countries, the city landscape has been regarded as important to enhance its competitive power. They have poured much effort to create a better city landscape through various methods and systems.

Therefore, this study is to examine and analyze congregated forms of apartment complexes that occupy most residential areas in the city, in order to provide organized information and to help creative ideal planning for high-rise apartment complexes.

Determinants and Types of Congregated Form

Congregated forms of apartment complexes are formative images presented by the combination of space organizing factors.¹⁾ Their images tend to be perceived easily.²⁾

The congregated forms are important in the planning of apartments, and great considerations should be given to them through the whole process of planning.

The congregated form is divided into the plane and the elevation dimension, depending on the features of the apartment.³⁾ The plane dimension is determined by locational merits of complexes, concept of designers and architectural regulation. It contains types of sites and exterior space, length and direction, pitch of blocks, and the circulation of cars and residents.

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They have great effects on the structure of the elevation dimension. The elevation dimension contains main building types that are influenced by plane dimensions, skylines decided by exterior color and materials, their combining effect and visual screening.⁴⁾⁵⁾ It also has great effects on the layout of buildings changing with the path of least resistance. (See Table 1).









Table.1 Determinants of congregated Forms

	Plane dimension	Elevation dimension
arrangement	concept of design, natural condition(direction/sunshine) cultural condition(symbols, recognition) regulatory condition(the pitch of blocks, the length of a block)	form of main building topography, gradient, capacity, height limit, mass, skyline, roof, color
exterior space	sequence, location, materials, pattern,	topography, height, modeling on street, change of season
circulation system	streets, recognition, parking lot, pedestrian passage	access, front view

Considering the determinants of the congregated forms, the plane dimension contains the parallel type, the cluster type and the combined type. The parallel type is uniform and simple because main buildings are mainly arranged in a southward direction. The cluster type has broad spaces between each unit and the combined type is a combination of the parallel and the cluster.

The elevation dimension is categorizing five types. In the simple-pile type, main buildings are arranged in the direction and they have a high degree of screening. In the vertical pile type, buildings are arranged according to heights and they also have a high degree of screening, but have perspective. In the variable type, buildings are arranged for a rhythmical effect. The simple pile plus combined type, and vertical pile plus combined type share various features of different types. (See. Table 2)

Table 2. Types of Congregated Form

	Plane dimension			Elevation dimension				
	parallel	cluster	combined	simple pile	vertical pile	variable	simple pile+variable	vertical pile+variable
Types								
Features	Direction Simple Uniform	Space Formation	Combined Organization	High-degree of screen Simple	Low-degree of screen Perspective	Partially Open Rhythmical	Combined	Combined

Evaluation of Landscape

Outline of the study

Nine public housing complexes, located in Munheung, Ilkok and Sangmoo districts, from 26 districts that completed the development of housing sites in Kwangju. The number of residents for each complex is more than 600 families, and

they have been assumed to be eligible for this study.⁶⁾

Using a 35mm color camera on the main road outside the apartment complexes surveyed, 94 congregated form scenes were photographed.⁷⁾ The similarity of the pictures was evaluated to draw the most representative of the three scenes by the multi-classification procedure. Then, the congregated scenes were used for the experiment, where a seven-staged S.D Method consisted of 41 pairs of adjectives and 25 items (except 16 items that have no distinctive power) were distributed for the experiment. Subjects for the psychological evaluation experiment were graduate students majoring Architecture because it was assumed that they have a appropriate knowledge about the congregated form layout.⁸⁾ The data resulting from the psychological evaluation experiment input into a computer. The general results of each form, including preference and evaluation of the quality of the landscape were examined. After evaluation factors were drawn and analyzed, their evaluation structure was also analyzed. (See Table 3 and 4)

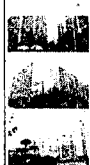

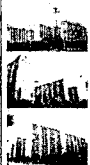
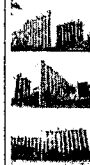
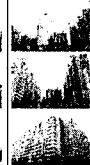



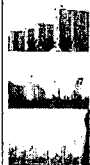









Preference and Evaluation

To find out the preference for the landscape, the congregated form layout was evaluated and an average point of preference was drawn for each complex surveyed. In the plane dimension, the cluster type was the most preferred form with 6.14 points, compared with 5.74 for the combined type and 4.22 for the parallel type.

Table 3. Adjectives used for Psychological Evaluation

X1. dynamic-static	X14. meaningful- not meaningful
X2. peaceful-busy	X15. cheerful- depressed
X3. interesting- uninteresting	X16. unique - common
X4. unified - not unified	X17. brilliant - modest
X5. concentrated - scattered	X18. various - not various
X6. soft - hard	X19. stable - unstable
X7. neat - dispersed	X20. continuous - not continuous
X8. distinct - not distinct	X21. natural - artificial
X9. clean - dirty	X22. dignified - not dignified
X10. attractive - not attractive	X23. variable - monotonous
X11. funny - dull	X24. delicate - dull
X12. warm - cold	X25. liberal - closed
X13. coarse - smooth	

Table 4. General Condition of Apartment Complexes and Congregated form Scene

		Muncheung District			Ilkok District		Sangmoo District			
		Line	Hyundai	Kumho	Daelim	Hyundai	Woomi	Line-Dongsan	Line Daejoo	Kumho Ssangyong
Picture										
	Type	Vertical Pile + Variable	Simple Pile + Variable	Simple Pile	Simple Pile	Variable	Simple Pile	Vertical Pile + Variable	Vertical Pile	Simple Pile
Arrangement										
	Type	Cluster	Combined	Parallel	Parallel	Cluster	Parallel	Combined	Parallel	Parallel
General Condition	Families	830	642	702	723	668	642	884	760	766
	Floors / Dong	15 ~ 20 (7 dong)	17 ~ 18 (6 dong)	14 ~ 16 (9 dong)	16 ~ 20 (4 dong)	15 ~ 18 (7 dong)	10 ~ 15 (5 dong)	16 ~ 20 (8 dong)	14 ~ 20 (4 dong)	17 ~ 20 (9 dong)
	Area	72,492.85 m ²	88,210.05 m ²	94,805.8 m ²	64,542.97 m ²	57,997.61 m ²	57,122.06 m ²	87,274.73 m ²	71,038.34 m ²	145,177.08 m ²

In the elevation dimension, the variable type had 6.77 points and was the most preferred one. The points for the vertical pile plus variable type were 5.85, which was relatively higher than the average. Points for the simple pile type was the lowest with 4.06 points.

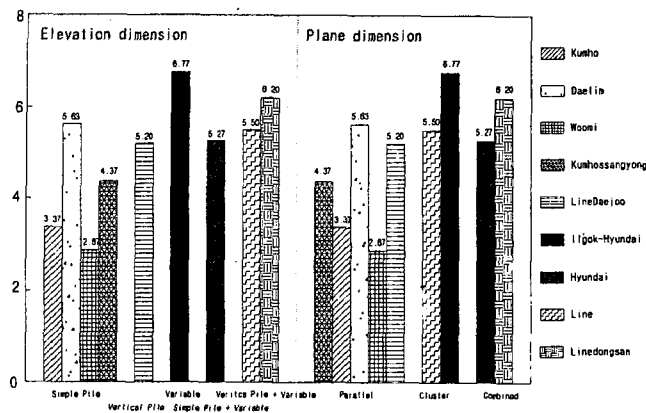


Figure 1. Preference of comparison between grouped

The Buildings that was the most preferred congregated form were those arranged in the cluster type (Plane dimension) and the variable type (Elevation dimension). The buildings with the parallel and simple pile type were the preferred. The rank of preference was shown in order: Ilkok Hyundai, Line Dongsan, Line Daejoo, Line, Munheung Hyundai, Daelim, Ssangyong Kumho, Kumho and Woomi apartments, depending on the types of congregated forms. (See Figure 1)

The value of evaluation about types of congregated form by the S.D psychological experiment was between 3.0 and 5.0 points. In the plane dimension, the cluster type, with 4.02 points, was most preferred, and the parallel type, with 4.21 points, was the least preferred. In evaluations of item X11, X12, X13, X6, and X18, the parallel type had a positive reaction, while in item X7, X4, X9, X2, and X19, it had a negative reaction. The cluster type had positive results in item X21, X6, X11, X12, X16 and X24 but it had negative results in item X4, X22, X5, and X7.

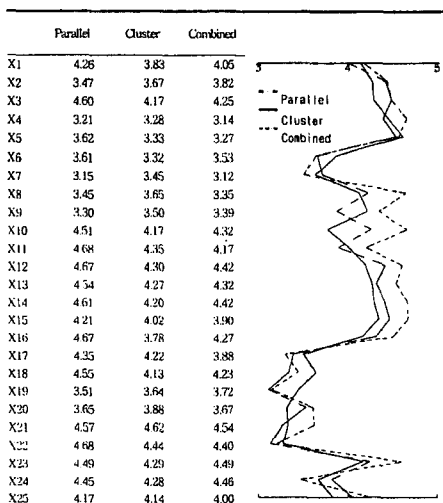


Figure 2. Psychological evaluation between grouped features(Plane dimension)

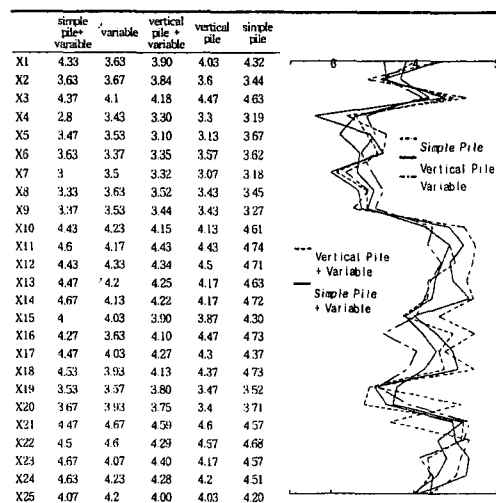


Figure 3. Psychological evaluation between grouped features(elevation dimension)

It was found that the combined type had positive results in items X16, X12, X21, X24 and X12 but had negative results in item X7, X4, X5, X9 and X8. In the elevation dimension, the variable type with 3.93 points was the most preferred while the simple pile type with 4.16 points was the least preferred.

The simple pile type had a positive reaction in items X11, X18, X12, X6 and X3 but had a negative reaction in items X7, X9, X8, and X2. The vertical pile type had a positive reaction in items X6, X12, X3 and X11 but had a negative reaction in items X7, X20, X4 and X5. The vertical plus variable type had a positive reaction in items X21, X11, X16, X12 and X24 but it had a negative reaction in items X5, X4, X7 and X22. The variable type had a positive reaction in items X21, X6, X24 and X10 had a negative reaction in items X22, X3, X7, X5 and X19. The simple plus variable type had a positive reaction in items X14, X16 and X11 but had a negative reaction in items X4, X7, X8 and X5.(See Figure 2, 3)

Evaluation Factors of Landscape

For the definition of landscape evaluation of congregated forms, factors were investigated by the Varimax Technique based on the data from the psychological evaluation. Five factors with more than 1.0 of Eigen value were found. Evaluation items with high importance were examined to get their definite meaning. Factor 1 consists of <unique-normal>, <attractive-not attractive>, <interesting-uninteresting>, and <variable-monotonous>, where all are related to independent images. Factor 2 consists of <unified-not unified>, <concentrated-scattered>, and <stable-unstable>, where all are related to uniformity. Factor 3 consists of <neat-dispersed>, <distinct-distinct>, and <clean-dirty>, all related to regularity. Factor 4 consists of <brilliant-modest>, and <opened-closed>, all related to esthetic property.

Table 5. Result of Factor Analysis

	Factor1	Factor2	Factor3	Factor4	Factor5
X10	.789	.116	.144	-8.565E-02	.105
X11	.763	7.625E-02	9.687E-02	-1.659E-02	.225
X16	.739	-2.443E-02	-6.375E-02	.250	-6.892E-02
X23	.735	-3.888E-02	2.587E-02	7.488E-02	9.694E-02
X18	.715	5.792E-02	-.180	.180	-1.789E-02
X3	.694	-8.934E-03	-5.133E-02	.305	2.700E-02
X12	.587	.193	7.636E-02	-.157	.469
X22	.585	.349	-2.412E-02	.271	.328
X21	.574	.161	8.842E-02	.170	.403
X1	.553	-2.500E-02	.131	.410	-.288
X14	.513	.115	-.200	.285	.413
X15	.442	-.196	9.914E-02	.331	.365
X24	.428	2.804E-02	.101	.314	5.966E-02
X19	.179	.796	-8.047E-02	-1.443E-02	-4.930E-03
X20	.170	.751	-6.283E-02	.137	-3.785E-02
X5	-4.832E-03	.692	.217	1.563E-02	9.469E-02
X4	-.247	.609	.425	9.583E-02	-6.884E-02
X8	.116	1.462E-02	.818	-8.616E-02	-.143
X7	-9.265E-02	.256	.784	1.902E-02	4.855E-03
X9	.138	-5.771E-02	.743	.187	1.705E-02
X17	.371	-.108	-8.487E-02	.579	-5.690E-02
X25	.161	.120	1.296E-02	.573	6.695E-02
X3	8.916E-02	.332	.232	.415	-9.412E-02
X13	-.297	.256	.162	.276	.506
X6	.183	-.110	-.172	-8.432E-02	.691
Eigenvalue	6.684	3.172	2.871	1.406	1.175
%of Variance	3.816	18.360	12.732	7.682	6.560
Cumulative%	44.816	53.176	65.908	73.590	80.15

Conclusion

In this study, the congregated forms for landscape evaluation were examined and analyzed. The High-rise apartment complexes were selected and their congregated form scenes were photographed. A psychological evaluation by subjects

to define their preference the congregated form types and to list evaluation factors. The cluster type on the plane dimension and the variable type on the elevation dimension of various congregated forms were preferred while the parallel and the simple pile type were the least preferred.

The results of type evaluation by the S.D psychological experiment were modest but, in the plane dimension, the cluster type had the most positive reaction and the parallel type had the most negative evaluation result. In the elevation dimension, the variable type had the most positive reaction but the simple pile type had the worst result. According to the analysis of factors, the evaluation results of landscape depends on the interaction of independency, uniformity, regularity, esthetic sense and texture factors.

However, the results have limitations because few subjects participated in this experiment. So, to get more objective results, a broader selection of subjects and a more concentrated research are required.

Notes

- 1) Lee, Jeung-Soo(1996), A Study on the Visual Elements of the Collective-Figures and the Townscape Design Approach for Multi-Family Housing Area, *Journal of Architectural Institute of Korea*. Vol.12 (2).
- 2) Rapoport, A.(1982), *The Meaning of the Built Environment*, Sage Publishing.
- 3) Lee, Jeung-Soo(1996), *op.cit.*
- 4) Lim, Seung-Bin(1997), *景觀分析論*, Seoul National University Press.
- 5) Lee, Jeung-Soo, *op.cit.*
- 6) Kwangju City(1998), *共同住宅事業承認現況*.
- 7) Lim, Seung-Bin(1997), *op.cit.*, p.226.
- 8) *Ibid.*, pp.246~ 247.

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