Study on Change in Scenic Views near High-rise Buildings

Simulation Analyses of the Scenic Views from the Primary Scenic Viewpoints in Kobe City, Japan

Naoko Kuriyama*, Koichi Miwa*and Shingo Suekane*

Abstract:

The purpose of this study is to suggest the view protection methods in terms of height limit of high-rise buildings, especially focusing on the panoramic views from the scenic viewpoints in Kobe City. This study consists of two phases. The first is to understand the physical structure and the people's evaluation of 42 scenic views from 34 scenic viewpoints by fieldwork and the image experiment. The second is to figure out the differences of the evaluation in the image experiment of the simulated pictures of the various heights of high-rise buildings. As a conclusion, we suggest the combination of five view protection methods, depending on the importance of the views in terms of protecting the existing view and local identity.

Keywords*:*

Scenic views, Viewpoints, High rise buildings, View protection method

* Kobe University
E-Mail: kuri@kobe-u.ac.jp

* This is an abstract peer-reviewed by the International Affairs Committee of the City Planning Institute of Japan for ISCP2014.

1. Introduction

For more than 30 years, local governments have regulated urban landscape issues. The Landscape Act, called "Keikan-hou" in Japanese, was enforced in 2005 and some local governments have established the policies on protecting scenic views in their landscape plans. However, it is still difficult to protect scenic views. The purpose of this study (1) is to suggest view protection methods regarding the regulation of high-rise buildings (2), especially focusing on panoramic views from scenic viewpoints in Kobe City.

This study consists of two phases. The first aims to understand the physical structure and people's evaluation of 42 views from 34 scenic viewpoints (second and third chapters, respectively). Method include fieldwork on scenic views in scenic viewpoints and an image experiment. The second phase involves exploring the differences in the evaluation and image experiment of simulated pictures of various heights of high-rise buildings (fourth chapter). In conclusion, we suggest the combination of five view protection methods, depending on the importance of views as well as protecting the existing views and local identity.

Reviewing studies on the relationship between the urban landscape and high-rise buildings, we obtained three main fields: the value of scenic views from high-rise condominiums[2)], the influence of high-rise buildings on the streetscape[3)], and the problems in controlling high-rise buildings[4)]. This study is a part of the third field. Its original perspective was to focus on the influence of high-rise buildings on scenic views from specific viewpoints.

2. Evaluation of the existing panoramic views from scenic viewpoints

"The Best 50 and 10 Scenic Viewpoints in Kobe City"[5)] were selected in 2008. We can identify 42 panoramic views from 34 scenic viewpoints. We have set two evaluation axes: the evaluation of the scenic views and the extent of their influence of the high-rise buildings. The evaluation of scenic views consists of three qualities: activity, identity, and the extent of view protection. Furthermore, the extent of influence of high-rise buildings consists of two qualities: the existence of high-rise buildings and the protection of skylines, coastline, or mountain ridgeline. We conducted fieldwork and the evaluation of the views in the summer and autumn of 2008. As a result, the seven categorized types are shown in Figure-1 and Table-2. Table-1 is the list of scenic views in this study. We estimated the view protection methods corresponding to each type and we judged that views of type E, F, G can be protected without specific view protection methods regarding high-rise buildings.

Table-1. List of scenic views shown in figure 1.

No.	Name of scenic views	No.	Name of scenic views
1	Hokura Shrine	2	Northern view from Rokko Island Kita Park
3	Southern view from Rokko Island Kita Park	4	Rokko Garden Terrace
5	Rokko Tenrandai (viewing platform)	6	Nada Maruyama Park
7	Kikusei-dai (viewing platform)	8	Nunobiki Herb Garden
9	Southern view from viewing floor in City Office	10	Northern view from viewing floor in City Office
11	Port Island Kita Park	12	Po-ai Shiosai Park
13	Kobe Airport	14	Kitano Tenmangu
15	Southern view from Port Tower	16	Northern view from Port Tower

17	Naka Tottei Chuo Terminal	18	Venus Terrace (viewing platform)
19	Mosaic (Shopping Area)	20	Himuro Town
21	Egeyama Park	22	Kosan Temple
23	Tsukuhara Lake	24	Hiyorodigoe Shinrin Park
25	Takatori Mountain	26	Suma Kaihin Park
27	Eastern view from Oraga Mountain	28	Western view from Oraga Mountain
29	Eastern view from Sumaura Sanjo Yuen	30	Western view from Sumaura Sanjo Yuen
31	Sumaura Park	32	Suma Umizuri Park
33	Iue Memorial Museum	34	Southern view from Goshikizuka Ancient Tomb
35	Northern view from Goshikizuka Ancient Tomb	36	Azur Maiko (beach)
37	Maiko Villa	38	Northern view from Sun Yat-sen Memorial Hall
39	Southern view from Sun Yat-sen Memorial Hall	40	Eastern view from Maiko Marine Promenade
41	Western view from Maiko Marine Promenade	42	Mekko Mountain

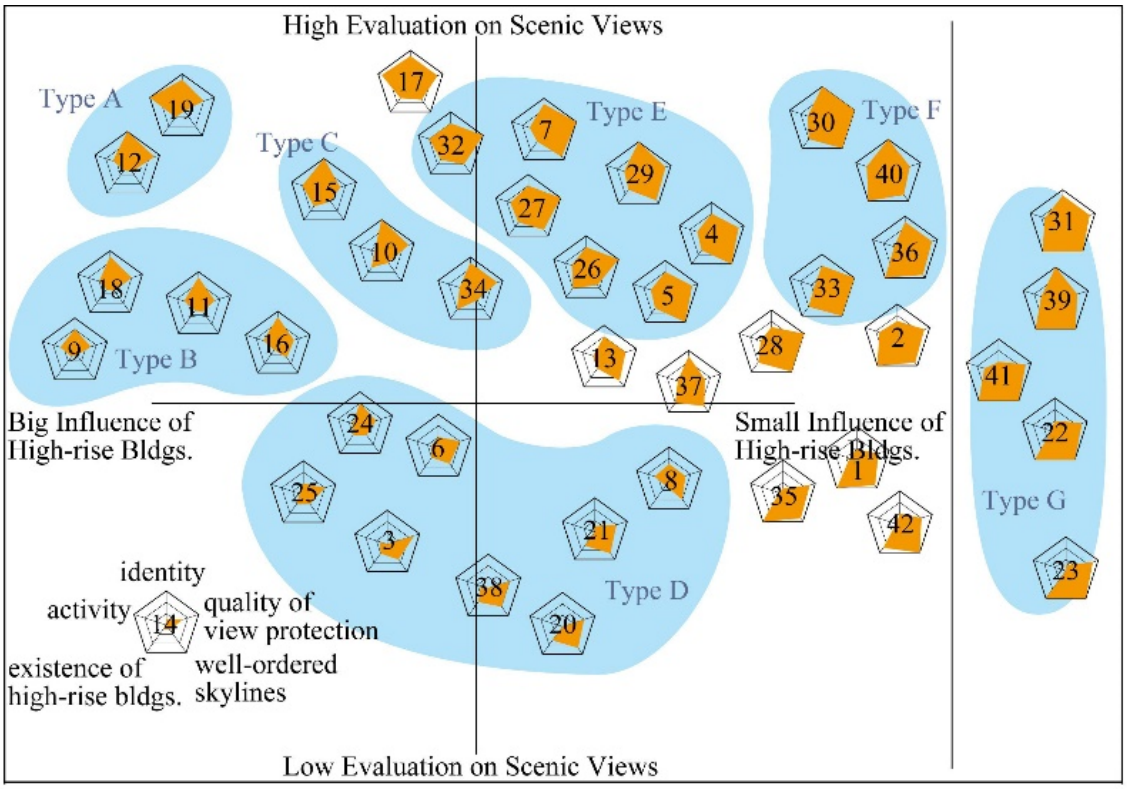

Figure-1. Types of scenic views from scenic viewpoints in Kobe City.

Table-2. Types of scenic views in Kobe and influence of the high-rise buildings on scenic views

Type	Characteristics	Present Evaluation		Influence of high-rise buildings on views		Scenic views number
		Scenic views	High-rise buildings	Obstructing the scenic views now.	Possibility of make the views worse.	
A	Urban views with local identity in city center.	Generally high evaluation.	Less high-rise bldgs. Low-ordered skylines.	No	Yes	12,19
B	Views in city center	Low identity. High view protection and activity.	Less high-rise bldgs. Low-ordered skylines.	Yes	Yes	9,11,16,18
C	Views of close high-rise buildings	High identity. Slightly low view protection and activity.	Some high-rise buildings in close distance. Low-ordered skylines.	Yes	Yes	10,15,34
D	Urban landscape	Generally low evaluation.	Some high-rise buildings.	Slightly Yes.	Yes	3,6,8,20,21, 24,25,38
E	Broad panoramic views with local identity	High identity and view protection.	Some high-rise buildings in the distant.	N/A	N/A	4,5,7,26,27, 29,32
F	Landmark	Generally high evaluation.	Less high-rise buildings.	N/A	N/A	30,33,36,40
G	Nature Landscape	High view protection.	Less high-rise buildings.	N/A	N/A	22,23,31,39 ,41

3. Evaluation of scenic views in the image experiments

To discover the psychological impression of scenic views, we conducted an image experiment in December, 2008. The participants were students in the department of architecture in Kobe University. The participants were asked to rate 42 photographs of scenic views on a 5 point rating scale. There were three categories: whether or not the view was good, whether the participant understood the view's local identity, and whether the participant felt that the high-rise buildings impacted scenic views.

Figure-2 shows the average score of three categories in each picture. The item of whether or not the view was good got the higher score than other two items. Scenic looking-down views from the mountains such as No.4,5,7,22,27,28,29 and 30 got the higher evaluation in the quality of the views. Regarding the item of whether the participant understood the view's local identity, scenic views of the waterfront area in the city center such as No.11,12,17 and 19, and scenic views of Akashi-Kaikyo Bridge got higher scores. Both of the views include the broad water surface. Moreover, regarding the impact from high-rise buildings, views including the high-rise buildings near the viewpoints got the lower scores such as No.3,9,10,11,14 and 38. Pearson product-moment correlation coefficient between view evaluation and impact of high-rise buildings was 0.609. As a result, we identified the strong relationships

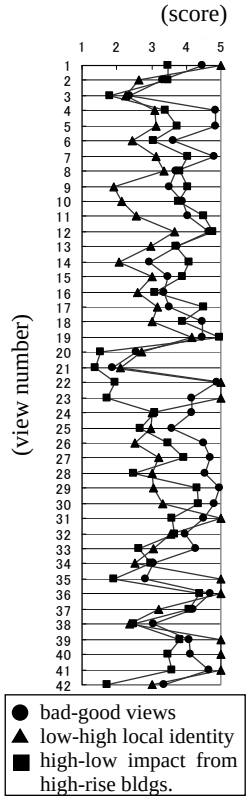

Figure-2. Evaluation of the scenic views

between the evaluation of views and the impact of high-rise buildings.

4. Simulation analysis of the scenic view in two image experiments

We conducted two image experiments with simulated pictures in December, 2008. We picked out No.12 scenic view, and the numbers and height of photographed high-rise buildings in the view were changed in the first experiment, whereas the form of high-rise buildings in the pictures was changed in the second experiment. The participants and the method in two image experiments were the same as those in the evaluation of existing scenic views in the image experiment.

Table-3 is the list of the simulated pictures in the first experiment. No.1 is the existing condition. We set the three conditions: the increasing number of high-rise buildings, change of the height of the existing high-rise buildings, and the decreasing number of high-rise buildings. Picture-1 shows the possible lines which can regulate high-rise building height.

Picture-1. Two possible lines which regulate the high-rise building height.

Table-3. List of the simulated pictures in the first experiment

Simulation condition	No.	Simulation contents		
		Existing High-rise Buildings.	Six High-rise buildings in planning	Additional buildings for this experiment
Existing Condition	1	unchanged	N/A	N/A
Increasing number of high-rise buildings.	2	unchanged	100m high	N/A
	3	unchanged	150m high	N/A
	4	unchanged	200m high	N/A
	5	unchanged	100m high	More 5 bldgs. 100m high
	6	unchanged	150m high	More 5 bldgs. 150m high
	7	unchanged	200m high	More 5 bldgs. 200m high
	8	unchanged	100m high	More 10 bldgs. 100m high
	9	unchanged	150m high	More 10 bldgs. 150m high
	10	unchanged	200m high	More 10 bldgs. 200m high
Change the height of the existing high-rise buildings.	11	175m high	N/A	N/A
	12	200m high	N/A	N/A
	13	Below the building height limit line determined in the planning view protection policy.	N/A	N/A
	14	Below the 80% of the building height limit line determined in the planning view protection policy.	N/A	N/A
	15	Below the ridgeline of the mountain.	N/A	N/A
	16	Below the 80% of the ridgeline of the mountain.	N/A	N/A
Decreasing number of high-rise buildings.	17	Deleted the high-rise buildings built before 1988.	N/A	N/A
	18	Deleted every high-rise buildings.	N/A	N/A

Figure-3 shows the result of the 1st experiment. Regarding the increasing number of high-rise buildings in comparing among no.2-5-8, no. 3-6-9, and no.4-7-10, we found that when more buildings were present, the general evaluation of the view was lower. We got the same result when the buildings got higher, the general evaluation of the view was lower in comparing among no. 2-3-4, no.5-6-7, and 8-9-10. Moreover, we found that the existing condition got higher scores in both whether or not the view was good and whether the participant felt that the high-rise buildings impacted scenic views well were higher, whereas whether the participant understood the view's local identity was lower, comparing with the less number of high-rise buildings (no.1-17-18).

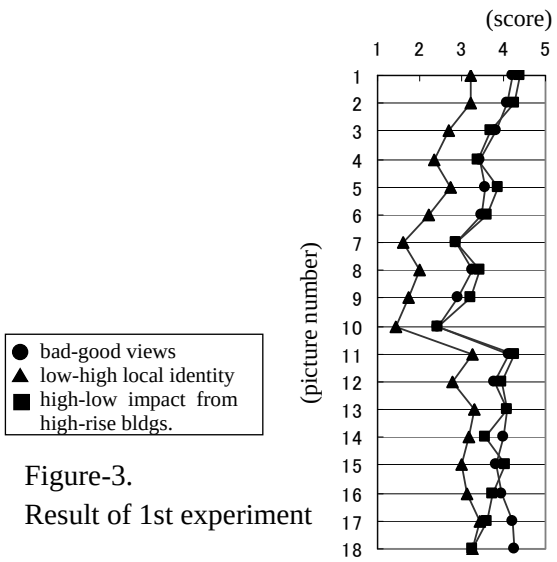

Figure-3.
Result of 1st experiment

In the second experiment, we chose one high-rise building in the picture and changed the form of the building including width, height, building area, total floor area. 14 simulated pictures are explained in Table-4 and two pictures are shown in Picture-2. Red tower in Picture-2 is Port Tower, a landmark of Kobe City. The purpose of this experiment is to discover the impact of the form of one high-rise building on scenic views.

Table-4. List of the simulated pictures in the first experiment

No.	Simulation Contents	Width of bldg.(m)	Height of bldg.(m)	Form of 1st floor (m)	Bldg. Area (m^2)	Mitigation of FAR**	Approximate total floor area (m^2)
1	Existing Condition. No high-rise bldg. on the simulated site.	-	-	-	-	-	-
2	No high-rise bldg. on the simulated site. Added some planning high-rise bldgs.	-	-	-	-	-	-
3	Changed the form of the bldg. on the simulated site. Added some planning high-rise bldgs.	50	150	50*30	1500	Yes	25000
4		40	150	40*40	1600	Yes	26700
5		30	150	30*50	1500	Yes	25000
6	Changed the form and Bldg area. Added some planning high-rise bldgs.	50	112	50*40	2000	Yes	25000
7		40	112	40*50	2000	Yes	25000
8	Same form and bldg. area as picture no.3-5. Decreased the height of bldg. by cancellation of mitigation of FAR. Added some planning high-rise bldgs.	50	105	50*30	1500	No	17500
9		40	105	40*40	1600	No	18500
10		30	105	30*50	1500	No	17500
11	Same form and bldg. area as picture no.3-5. Decreased the height of bldg. by cancellation of mitigation of FAR. Added some planning high-rise bldgs.	50	77	50*40	2000	No	17000
12		40	77	40*50	2000	No	17000
13	Decreased the bldg. area and changed the form. Added some planning high-rise bldgs.	40	189	40*30	1200	Yes	25000
14		30	189	30*40	1200	Yes	25000

** Mitigation of FAR can be applied by overall design system, which is called as “Sougou sekkei seido” in Japanese, based on Japan’s Building Standards Act.

No.1 in the 2nd experiment. No.13 in the 2nd experiment.

Picture-2. Examples of pictures in the 2nd experiment

Figure-4 shows the result of the 2nd experiment. Comparing no.1 and 2, three items got much lower by the increasing the high-rise buildings. However, the gap of scores among the simulated pictures are slighter than those in the 1st experiment. Therefore, we found that the impact of the change of one high-rise building on the scenic view is slighter than that of the some high-rise buildings on the scenic view. Moreover, the score of no.3 is lesser that that of no.2, which shows that high-rise buildings near the landmark can impact badly on the scenic view quality. Especially, in the case that high-rise building are much higher such as no.13 and 14 next to the landmark, the scenic view quality got much lower as Figure-4 shows.

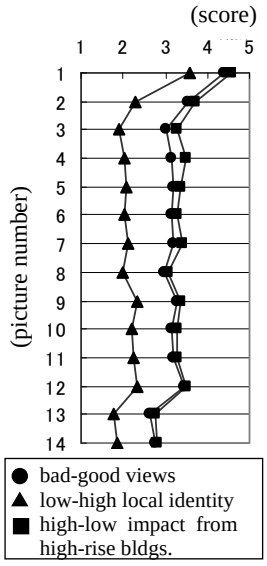

Figure-4.
Result of 2nd experiment.

5. Conclusion

In this study, we found seven types of the scenic views in the primary scenic viewpoints. Looking-down scenic views from the mountain or hillside urban area (type B and D) and looking-up scenic views from the waterfront area (type A, B, C and D) have the possibility that the scenic views would be obstructed by high-rise buildings, because high-rise buildings can cut the ridgeline, coastline, horizontal line in scenic views, depending on the height of buildings. Moreover, scenic views in the urban area (type B and C) have been already obstructed by high-rise buildings. Regarding the impression on the existing scenic views, we found that relationship between good and bad evaluation of scenic views and impact of high-rise buildings is strong. Especially, looking-down scenic views from the mountain and hillside area and views from the waterfront got higher evaluation and high-rise buildings near the viewpoints have impacted badly on the scenic views. Therefore, we showed the necessity of view protection methods in terms of high-rise buildings.

We conducted two image experiments, In the 1st experiment, we figured out that when the number of high-rise buildings are more, the evaluation of scenic views are lower. In the second experiment, we found that the high-rise buildings near the landmark impacted the evaluation badly on scenic view, even though high-rise building doesn't obstruct the view of the landmark directly.

Based on the results of this study, we suggests the combination of five methods for

protecting scenic views at scenic viewpoints in Kobe City as Figure-5 and Figure-6 shows. Figure-5 is the image of the view protection plan and Figure-6 is the image of the view protection section. The methods comprise establishing the regulation of number (A), height (B), and form (C) of high-rise buildings. Their development should also be restricted near the landmarks (D) and scenic viewpoints (E), depending on the importance of views in terms of protecting the existing view and local identity.

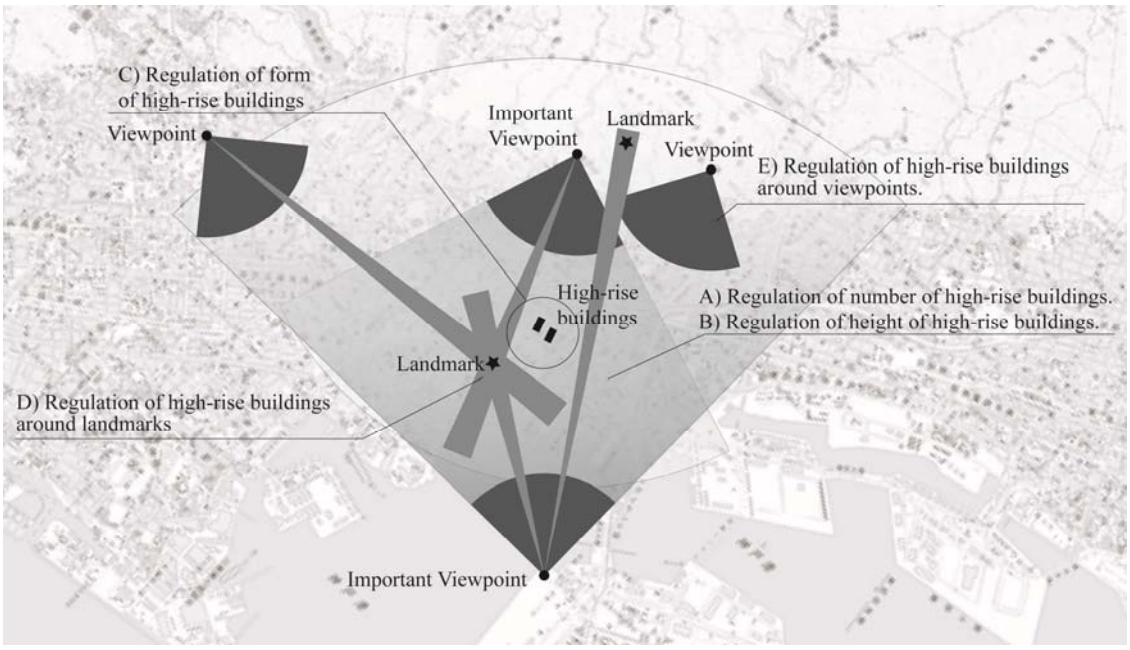

Figure-5. View protection image plan in terms of high-rise buildings in Kobe City

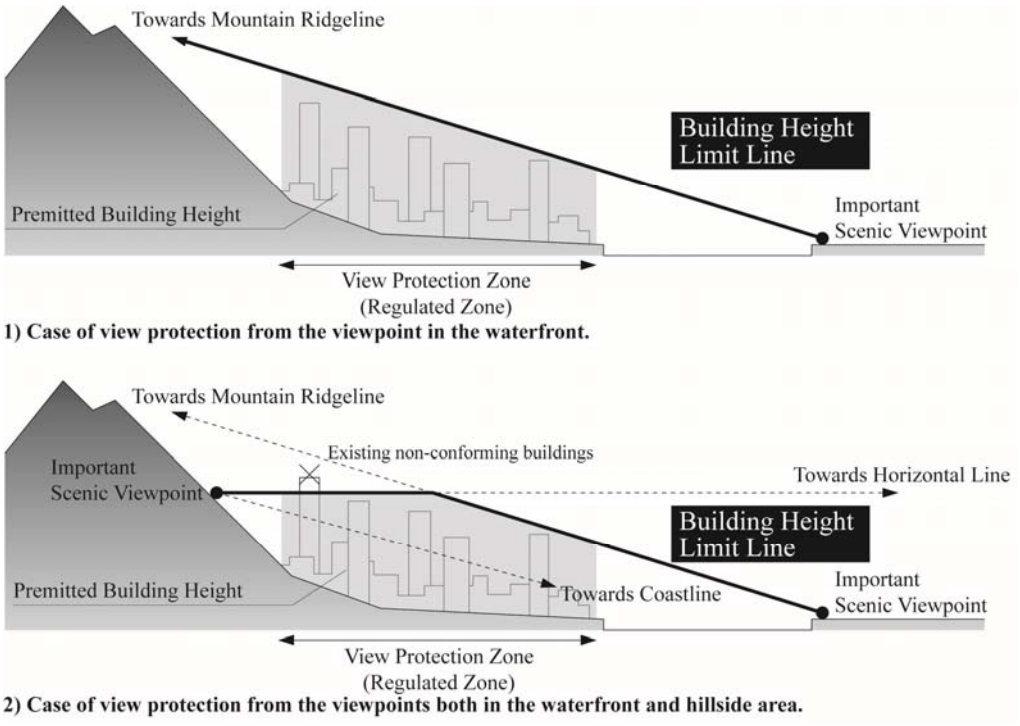

Figure-6. View protection image section in terms of high-rise buildings in Kobe City

Notes:

(1) This study was based on the fieldwork and analysis of reference 1). Reference 1) is not a judged paper.

(2) We defined more than 100 meters high buildings as “high-rise buildings” in this study.

Reference:

1) Ryosuke Horiguchi, Koichi Miwa, Shingo Suekane and Naoko Kuriyama. Study on the change of the Urban Landscape by High-rise building: Simulation analyses on the Scenic Views from the main viewpoints in Kobe City, Nihon kenchiku gakkai kinki shibu kenkyuu houkokushuu, (Architectural Institute of Japan Kinki Chapter research meeting-Planning), 2009, Vol.49, 533-536, Japanese

2) Makoto Yoshida, Norishisa Yokouchi et al, A Study on the Appraisal on Views Commanded from High-Rise Apartments, City planning review. Special issue, Papers on city planning 32, 1997, 487-492, Japanese

3) Norio Koba and Tatsuya Kishimoto, Impression evaluation of streetscape by super high-rise buildings set-back in high-rise part: streetscape analysis using virtual reality in Marunouchi-nakadori avenue, Journal of architecture and planning (Transactions of AIJ), 2009, 74(645), 2435-2442, Japanese

4) Keiichi Kobayashi, A Consideration of Height Control System in a Regional Hub City: Based on a Review of Regulations and a Survey for Planning Issues in Yamagata City, City planning review. Special issue, Papers on city planning 41(3), 2006, 493-498, Japanese

5) The Best 50 and 10 Scenic Viewpoints in Kobe City: Kobe City, Japan, http://www.city.kobe.lg.jp/culture/culture/enterprise/keikan/choubou_pamphlet.html, 2014/Sep.1st