A FORM ANALYSIS OF JAPANESE PEDESTRIAN DECKS AND EUROPEAN PLAZAS

Abstract: This study compares Japanese pedestrian decks and European plazas as public pedestrian spaces. The characteristics of both types of spaces will be clarified through a schematic analysis. The connections of these spaces with their surroundings will also be analyzed. Further, the spatial image of these spaces are discussed. Pedestrian spaces in Romania will be discussed as well.

Key words: Pedestrian Space, Public Space, Plaza, Pedestrian Deck, Schematic Analysis.

1. INTRODUCTION

In European cities, the structures of which were formed in the Middle Ages, plazas are often located in city centers and surrounded by buildings. Photo 1 shows an example of a plaza in Italy. In Japan, whose history is different from that of Europe, pedestrian zones are rarely located in spaces surrounded by continuous elevations of the buildings, as most Japanese buildings are detached at a certain distance from one another.

In recent years, pedestrian spaces have often been built near railway stations in Japan, especially in large urban areas such as Tokyo. Tokyo's railway network is highly developed. The population of the Tokyo metropolitan area is about 30 million. Calculation the data of Ministry of Land, Infrastructure, Transport and Tourism (2013)[1], within a radius of 40 km from Shinjuku, one of the city's multiple centers, there are 1,276 stations (294 stations for Japanese Railway lines, 726 stations for private railway lines, and 256 for the subway system).

In this area, at least 68 pedestrian decks have been constructed as railway station annex facilities. Photo 2 shows an example of a pedestrian deck. A number of pedestrian decks have been connected with underground shopping centers or pedestrian priority roads around such stations, and commercial facilities, office buildings, housing complexes, parks, and other establishments are also linked to the stations.

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Form Data of Pedestrian Spaces.			
	Area	Perimeter	Pede Length
Plazas in Italy			
Firenze Piazza del Signoria	9,342 m2	470 m	1.3 km
Siena Piazza del Campo	11,728 m2	434 m	1.0 km
Pistoia Piazza di Duomo	6,215 m2	438 m	1.1 km
Padova Piazza delle Erbe & del Frutti	9,346 m2	730 m	1.6 km
Pedestrian Decks in Japan			
Kashiwa (Chiba)	8,641 m2	2,262 m	
Mizonokuchi (kanagawa)	5,898 m2	1,466 m	2.6 km
Matsudo (Chiba)	3,757 m2	1,220 m	
Kawasaki (Kanagawa)	3,774 m2	1,444 m	6.6 km
Odaiba (Tokyo)	36,743 m2	7,794 m	9.9 km
Pedestrian Routes in Romania			
Timișoara			2.6 km
Iasi Piața Unirii			0.6 km

Japanese pedestrian decks appear similar to European plazas as public pedestrian spaces, as they include areas both for rest and for events. However, pedestrian decks and European plazas are contrasting in form. Pedestrian decks are linear structures that are lifted into the air, whereas European plazas have rounded forms located on the ground.

This study will attempt to clarify the characteristics of pedestrian spaces through a form analysis. To compare the characteristics of plazas and pedestrian decks, computer graphics models were created by simplifying their forms. The form analysis and landscape simulation will be carried out based on these models. Subsequently,



Photo 1 Piazza del Campo (Siena, Italy).



Photo 2 Pedestrian Deck (Kashiwa, Japan).

Table 1



Fig. 1 Three-dimensional Computer Graphic Models of Italian Plazas.

the characteristics of the pedestrian spaces will be verified.

2. EUROPEAN PLAZA

Fig. 1 presents computer models of four plazas in Italy. The graphics represent simplified models based on the consideration that the plazas are enclosed by the varied elevations of the surrounding buildings [2]. In Fig. 1, streets that link to the plazas are modeled as well. These streets connect different plazas or link plazas with major intersections. The elevations surrounding the plazas are seen from most of the points on these streets. Together with the peripheral streets, the plazas form



Fig. 2 Views from Streets around the Plazas.



Fig. 3 Plans of Plazas and their Pedestrian Routes.



Fig. 4 Three-dimensional Computer Graphic Models of Japanese Pedestrian Decks.

pedestrian space.

Fig. 2 shows perspective views seen from points on the peripheral streets. The view of the tower or the major landmark in the plaza, or the emergence of the open space, are implicated in these spaces.

The plans of the plazas and the peripheral streets as pedestrian spaces are shown in Fig. 3. The form data of these spaces are listed in Table 1. In addition, form data of the other pedestrian spaces, which are explained later, are also provided in Table 1.

The areas of the plazas vary from $6,200 \text{ m}^2$ to $11,700 \text{ m}^2$, whereas plaza circumferences vary from 430 m to 730 m. When the length of the pedestrian routes are calculated by adding the length of the center lines of the



Fig. 5 Distribution of pedestrian decks in Tokyo metropolitan area.



Photo 3 Activities on Pedestrian Deck (Kashiwa).

peripheral streets and the circumferences of the plaza, the values vary from 1.0 km to 1.6 km.

3. PEDESTRIAN DECKS IN JAPAN

3.1. Distribution of pedestrian decks

Computer graphics models of five major pedestrian decks in Tokyo metropolitan area are shown in Fig. 4. These simplified models are made by adding heights to the plane forms of the pedestrian decks and surrounding buildings, to express their form composition.

The pedestrian decks have been constructed as railway station annex facilities. In 1973, the pedestrian



Photo 4 Plants on the Pedestrian Deck (Mizonokuchi).

deck connected to the east entrance of Kashiwa station (see Photo 2) was constructed as the first pedestrian deck in Japan. Since then, a number of pedestrian decks have been constructed.

The author surveyed an area within a radius of 40 km from Shinjuku [3], one of the multiple city centers, and found at least 68 pedestrian decks [4], shown in Fig. 5. In this work, a pedestrian deck is defined as follows: (1) connects a railway station to its surroundings; (2) a structure lifted in the air; (3) has elements to make pedestrians stop on the deck and engage in activities.





Photo 5 Pedestrian Deck (Odaiba).

3.2. Pedestrian deck as a space with a sense of enclosure

In dense urban areas, most pedestrian decks are constructed not along with establishments of stations but with redevelopments to improve the efficiency of traffic around stations. Sewing the gap between the buildings, decks bring a constant flow of pedestrians, who may also engage in various activities, such as rest, rendezvous, and performances (see Photo 3).

A portion of the pedestrian decks is a passage with a certain width. However, as a whole, pedestrian decks have spread shapes to surround certain regions.

Unlike plazas, pedestrian decks are not enclosed by the continuous elevations of peripheral buildings. There are few connected buildings, giving only partial enclosure. Buildings with inconsistent heights are cluttered around pedestrian decks. However, as pedestrian decks are lifted from the ground, they have distinct domains. Moreover, visually, but not physically, these spaces are surrounded by peripheral buildings. A number of pedestrian decks have elements, such as plants with sufficient heights, to emphasize their boundary (see Photo 4). A sense of enclosure similar to European plazas is observed on pedestrian decks.

3.3. Form of pedestrian decks

Referring to the form data of pedestrian decks shown in Table 1, Odaiba, a recently developed reclamation



Photo 6 Pedestrian Deck (Matsudo).

district, which has four stations and multiple large-scale commercial facilities, has several pedestrian decks that are exceptionally large in scale (see Photo 5). Other than this exception, the areas of the pedestrian decks vary from $3,700 \text{ m}^2$ to $8,600 \text{ m}^2$. Therefore, these areas are smaller in area than those of plazas. However, the circumferences of the pedestrian decks are much longer than those of plazas.

Generally, pedestrian decks feature diversity in form. Nonetheless, the circumferences of pedestrian decks are typically long and their areas small, whereas plazas have the opposite dimensions. The differences in form between pedestrian decks and plazas can be explained through the relationship between their areas and circumferences, as a figure with large area and short circumference has a round shape, and vice versa has a linear shape.

3.4. Pedestrian routes

With links to the ground level spaces, such as bus terminals, taxi stands, underground malls, surrounding commercial facilities, pedestrian priority streets, and parks, pedestrian decks form long pedestrian spaces around the stations.

The pedestrian route maps around the three stations are shown in Fig. 6. Pedestrian routes are defined as walking paths on underground malls, parks, pedestrian



Photo 7 Piața victoriei (Timișoara).



Photo 8 Piața Unirii (Timișoara).



Fig. 7 Pedestrian Route in Timisoara.

priority roads, and sidewalks with sufficient width. These are ranges where pedestrians can walk without having to cross car traffic roads. However, as a rule, pedestrian priority crossings are marked in intersections that do not have traffic lights, and priority to pedestrians is observed.

By avoiding overlapping, pedestrian routes are defined to traverse along pedestrian spaces. The length of the pedestrian route in Mizonokuchi is 2.6 km, that in Kawasaki is 6.6 km, and that in Odaiba is 9.9 km. These values are larger than the previous calculation of pedestrian routes in plazas, which vary from 1.1 km to 1.6 km. This comparison is not rigorous, as the definitions of the routes are inconsistent. However, this method is considered as a hypothesis for measuring scales of various pedestrian spaces.

Regrettably, pedestrian decks and peripheral streets do not look together. Spatial unity as seen in European plazas is hardly observed (see Photo 6). Lack of their aesthetic quality should be improved in the future planning.

4. PEDESTRIAN SPACES IN ROMANIA

In Romania, attractive pedestrian spaces exist as well. Photo 7 and Photo 8 shows examples.

Fig. 7 and Fig. 8 show aerial photographs by Google Earth [5] of spaces in Timişoara and Iaşi. The space in Timisoara includes several plazas and broad pedestrian streets with a park. Piața Unirii and its connecting street in Iaşi form a small-scale pedestrian space. The compositions and scales are different, but these spaces bear an aesthetic similarity with other pedestrian spaces.

When applying the previous method, the length of the pedestrian route in Timisoara is 2.6 km, and that in Iași is 0.6 km.

5. CONCLUSION

Pedestrian decks have unique linear forms as they are constructed with the redevelopment of concentrated city centers. Although the forms of pedestrian decks and European plazas are different, both offer a certain sense of enclosure in common. Thus, pedestrian decks have the potential to be spaces similar to plazas in the sense that a variety of activities are made available for pedestrians.



Fig. 8 Pedestrian Route in Iași.

Connecting to its surrounding, pedestrian decks forms large scale pedestrian space. The lengths of pedestrian routes are much longer than those of plazas. However, sense of space on such routes is considered to be inconsistent. Pedestrian routes connect various spaces, but a consistent sense of space is not likely to be created. A design to consider the spatial unity of pedestrian spaces is advisable.

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