ABSTRACT:
This paper deals with parallel stories of urban spaces in Skopje and Niigata suffered from earthquakes broke out in 1963-64.

Having clarified features of houses built after these earthquakes (construction sites, contractor or defrayer, the numbers of houses, etc), this paper provides several case studies based on interviews or documents how residents have sought for their ways to live in these houses with alteration or reconstruction.

In Skopje, sufferers settled down in these pre-fab houses one or two years after disaster and many of them still live in, with vertical or horizontal alteration.

But in Niigata, sufferers settled down in the so-called barracks had to move again within two years after disaster and found or constructed new place to live in. Now, most of those houses built in the process of reconstruction have been demolished and reconstructed.

With such comparison, this paper shows difference of systems / cultures of reconstruction between Macedonia and Japan and conclude future alteration of the system / culture in Japan.

Keywords: Skopje, Niigata, temporary housing, living continuity, evolution of building, housing history

1. INTRODUCTION

1.1. Background and Purpose

50 years have passed since Skopje 1963 Earthquake occurred. One year after the Skopje Earthquake, on the other side of the world, in the far east in Japan, the Niigata 1964 Earthquake occurred. To re-consider Japanese system for reconstruction, this paper observed how temporary housings stood up and survived until today in Skopje and made some comparison between a Case in Niigata.

1.2. Method

First, information on the actual reconstruction schedules in both Skopje and Niigata were gathered referring to books and public documents to understand general situation. Then, 11 interviews were conducted with residents of those prefab-houses in September in 2012 in Skopje (among them, information got from 3 interviews are described in this paper).

Interviews with measuring surveys were implemented with Mr. Masakazu Ishigure (Meiji University, M. Eng.) and Ms. Alexandra Krstik (Osaka University, M.Eng., from Skopje).

2. COMPARISON OF SKOPOJE AND NIIGATA EARTHQUAKES

2.1. General Information on two Earthquakes
Table 1 shows general information on the 1963 Skopje and 1964 Niigata Earthquakes. It is clear that human damage of Skopje case was much bigger than Niigata case. But, actual number of “roofless” people were around 150,000 in both cases. It means both municipality were asked to supply emergency housing enough to accommodate 150,000 people as soon as possible.

Table 1 General information on the 1963 Skopje and the 1964 Niigata Earthquake

<table>
<thead>
<tr>
<th></th>
<th>SKOPJE</th>
<th>NIIGATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Disasters</td>
<td>26 Jul, 63</td>
<td>16 Jun, 64</td>
</tr>
<tr>
<td>Population</td>
<td>180,000</td>
<td>325,018</td>
</tr>
<tr>
<td></td>
<td><strong>1070</strong></td>
<td><strong>11</strong></td>
</tr>
<tr>
<td></td>
<td>mortality</td>
<td>0.59%</td>
</tr>
<tr>
<td></td>
<td>(unknown)</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Destroyed</td>
<td>15,800</td>
</tr>
<tr>
<td></td>
<td>Damaged</td>
<td>28,000</td>
</tr>
<tr>
<td></td>
<td>150,000</td>
<td>144,097</td>
</tr>
<tr>
<td></td>
<td>roofless%</td>
<td>83.33%</td>
</tr>
</tbody>
</table>

2.2. Housing Supply in emergency phase

Table 2 shows number of emergency housing supply by municipalities (or by public sectors) in both cities. We can see so large number as newly-built 14,000 prefab- and repaired-houses in Skopje. In fact, “damages” found in Skopje were merely seismic damage, but on the other hand, in Niigata, they were not only seismic but also tsunami damage (so, it implies that “some” of them were simply soaked, not destructed structurally).

For Niigata case, detailed construction period is shown. Though the number of supplied temporary houses was not so many as in Skopje, it is necessary to pay attention to quick reaction and short construction period for supplying 610 temporary houses (i.e., 96% of total number), within a month after the earthquake.

Table 2 Emergency Housing Supply Records

<table>
<thead>
<tr>
<th></th>
<th>Temporary Houses</th>
<th>Repaired Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prefab Houses</td>
<td>Other types</td>
</tr>
<tr>
<td>SKOPJE</td>
<td>14,000</td>
<td>*</td>
</tr>
<tr>
<td>construction period</td>
<td>One year and four months</td>
<td></td>
</tr>
<tr>
<td>NIIGATA</td>
<td>186</td>
<td>450</td>
</tr>
<tr>
<td>construction period</td>
<td>10 with 17 days</td>
<td>300 with 12 days</td>
</tr>
<tr>
<td></td>
<td>100 with 28 days</td>
<td>200 with 17 days</td>
</tr>
<tr>
<td></td>
<td>28 with 54 days</td>
<td>60 with 28 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than one month</td>
</tr>
</tbody>
</table>

2.3. Actual Reconstruction Schedules

According to some books and documents, there were strong contrasts in (1) quickness and (2) time length of both supplying temporary housing and urban planning decision between actual schedules of reconstruction in Skopje and Niigata (Figure 1).

For example, temporary housing supply in Skopje accelerated around three months after the
earthquake, while in Niigata, though number of supply was rather smaller than in Skopje, within a month they almost finished constructing temporary houses (refer also to 2.2, Table 2). This quickness is in accordance with the Ordinance of the Disaster Relief Act in Japan. And in Niigata the city authority removed temporary houses two years (also because of the Ordinance) after the earthquake and on one of the former site of temporary houses they promoted the commemorative reconstruction completion festival, though in Skopje the city authority has (had) been supplying temporary houses more than 10 years, since after they could be privatized in case of request from residents. Now in Niigata NO emergency temporary houses are remaining and in Skopje still so many are surviving.

This “slowness” can be observed also in urban planning process. In Niigata the city authority spent only two months for the decision of urban plan (though, again, the size of destruction was much smaller than in Skopje, in deed), while in Skopje the final version of (the ninth) urban plan was decided 3 years after the earthquake. When citizen in Skopje celebrated the completion of reconstruction work, 17 years have already passed. The length of time for urban planning decision making was the reason for supplying temporary houses for such a long period of time.

3. PREFABRICATED HOUSING IN SKOPJE AFTER THE EARTHQUAKE

3.1. Housing Supply System

For those roofless people, the Executive Board of the Central Committee of the League of Yugoslav Communists planned to repair buildings to accommodate 50,000 and construct prefab housings to accommodate 70,000 one week after the disaster (United Nations, p.50). 10 days after the Earthquake, demountable dwellings were imported from overseas (United Nations, p.93) and such foreign countries as Austria, Bulgaria, Czechoslovakia, Denmark, Finland, France, West Germany, Italy, Mexico, Norway, Poland, Sweden, Switzerland, and the United States of America have donated prefab-housings, but 82% of the 14,000 single storey prefab-housings (i.e., 5 people per one house as to accommodate 70,000 people) established in the First stage of Reconstruction (till the end of 1964) (United Nations, p.74) were produced in Yugoslavia itself (Figure 2).

According to the interviewees, the City of Skopje seemed to allocate those temporary housings through workplaces of the roofless, but according to the official document in the City Archive it allocated temporary housing also to respective local administrative districts (Figure 3). As mentioned above, 82% of the prefab-housings were from Yugoslavia. So, it is natural that these three cases from the interviews described in the 4th chapter houses are ALL from the former Yugoslav republics.
3.2. Prefab-housing estates

The construction sites were, according to the United Nations records, chosen few months after the disaster with slight cost comparison (United Nations, p.81) (Figure 4). The built-up area of the city has been almost doubled after the disaster; in 1961, 2 years before the earthquake, it was around 1,200 ha., but in 1964, around 2,500 ha. (these sizes were estimated through tracing built-up areas on the aerial pictures, taken in 1961 and 1964, shown at the Institute of Town planning and Architecture Skopje. In 1961, some parts of such prefab-housing districts as Taftalidze, Crnice, Tasino Cesmice, Kisela Voda, Aerodrom had been built-up already).

4. TRANSITION OF PREFABRICATED HOUSING IN SKOPJE

4.1. Case 1 A Bosnian-made prefab housing in the Settlement Singelik (Figure 5)

Interviewee, born in 1960 in Skopje, is the nephew of original owner who was allocated the semi-detached house called Krivaja (Zavidovic) in the Settlement Singelik (refer to Figure 4) from a Bank in 1964, which the original owner worked for, and moved from the left bank of Vardar River. According to him, the original owner purchased the house when the Fund running prefab housing estates was abolished.

At first 3 members were living in it and after parents of the original owner had died the interviewee moved in and added second floor in 1983 to start living with his aunt (original owner).

Through interview and observation, the size of the prefab-housing before alteration was 60 sq. m and then the first floor was enlarged to 69 sq.m and the second 118 sq.m.

Having added 7 steel-made columns to support the Second Floor, they have enlarged the bigger
bed room ( extending even beyond the party wall ) and the smaller one was altered into bath. Both were because the smallness of original plan. At the same time, with the shadow of second floor in which new comer, the nephew, started to live in, being approached with exterior stair ( i.e., approach for the second floor is independent from the first floor ), Verandah facing to north can enjoy pleasantness even under strong sunshine in summer. The interviewee told me that it was not necessary for them to install any air-conditioning systems for summer time at all , but on the other hand , it was necessary to add slate-wavy-tiles onto original wooden exterior walls both for cold weather protection in winter and stopping aging degradation.

They were to remove the first floor in the next year ( 2013 ) due to ground unequal settlement but continue to live in the second floor as it was built structurally independent from the first floor with 7 steel-made columns. As the slate-wavy-tiles both for exterior wall and roofing contain asbestos, it is necessary for the owner to take care when they implement reconstruction.

4.2. Case 2 A Slovenian-made prefab housing in the settlement Vlae ( Figure6 )

Case 2-(a) The south-eastern part of the building

This building is a single-storey four-family one called Edilit in the settlement Vlae ( refer to Figure 4 ) and I had two interviews there. The first interviewee , born in1967 in Skopje , was not related to the original owner by blood and moved in as a homebuyer just when got married in 1999.

The original size of each house was 40 sq.m and the first interviewee has integrated original bath space into kitchen and with the added-space got new bigger bedroom and created new bath.

Now their house occupies 59 sq.m and accommodate 4 members ( father, mother and two children ) ( dark half-tone part of floor plan shown in Figure 6 depicts extended sections ).

During the renovation work, they have lowered level of lintels , which may attribute to the
difference of climate between Slovenia (rather cold in winter and need as much sunshine as possible) and Macedonia (rather hot in summer and need more shade for avoiding sunshine). At the same time, in accordance with the alteration of storage into the bigger bedroom, they have cut a larger window. They also lowered windowsill of a window facing front yard and change it into a back door.

The exterior wall is made of ALC (autoclaved lightweight aerated concrete) panel and roofing of asbestos, so the latter cause problem also for this case.

Case 2-(b) The north-eastern part of the building
The second interviewee (living in the north east part), born in 1934 in Kumanovo and moved into Skopje in 1953 during his student days, started to live in the house in 1969 and the next year added underground garage and workshop. Then, as married in 1973, he extended the above-ground level structure following the instruction from the municipality (Figure 7). Now their part occupies 82 sq.m (i.e., twice as large as the original size. Dark half-tone part of floor plan shown in Figure 6 depicts extended sections as above-mentioned).

4.3. Case 3 A Serbian-made prefab housing in the settlement of Kozle (Figure 8)

The interviewee, born in 1958 in Skopje (in the left bank of Vardar River, sharing an old house with another family), has evacuated from the city after the earthquake and stayed first in Gevgelija (Macedonian city at Greek border) and second in Madzari district in Skopje. Then, father of the interviewee, the original owner, received this detached house called Taramont in the settlement Kozle (refer to Figure 4), from his workplace (public sector) in 1964. The interviewee told me that as they were living in an old house so densely together with another family before the earthquake, quality of life enhanced when they moved into the new one.

At first, it occupied 60 sq.m. The exterior wall is made of ALC. The original owner had extended the building into 85 sq.m in ca. 1965-67, though family size or heights of family members had not (much) changed and the house was still not privatized yet. With this extension work, living room was moved from the northern to the southern side of the building and enlarged. The former living room was altered into bedroom. It can be attribute to the fact that they could enjoy much sunshine than before. Out side of the living room verandah with overhanging eaves was added. They seemed to determine the depth of the overhanging eaves in accordance with summer strong and winter weak sunshine. As they connected living room with dining room (i.e., former bed room), they separated function of cooking and dining. Portico was added to entrance.

From the original family, brother of the interviewee had moved out in 1975 as he had got married and in 2000s parents of the interviewee died one by one. Then, son of the brother (nephew of the

Figure 8 Prefab-housing in Kozle
Interviewee moved in and now the house accommodates also his wife and child (grand nephew). Recently, to enhance adiabaticity, the interviewee put thermal insulation on roof under roofing tile and gypsum on exterior wall.

5. CONCLUSION

This paper observed the reconstruction process of Skopje after 1963 earthquake, focusing on its prefab-housing which were to be built for temporary use for certain period of time. Through the interviews and measuring surveys, various situations of building evolution were found. It is no doubt that such building evolutions were realized because of housing lots being large enough to do so and of later privatization. It must have contributed stabilization of earthquake survivors’ lives.

But, it was possible under the condition that still there had been plenty of vacant land around the city-built-up area within short radius. I have found one housing estate in Niigata built in 1966, though it is still owned by municipality, with few building-evolution activities (Figure 9). Because of narrow front yards, residents seemed not to be able to extend their houses like in Skopje.

Housing history of Skopje after the 1963 earthquake is really suggestive, but it is necessary to discount through consideration of its contemporary context.

ACKNOWLEDGEMENT
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REFERENCES

SOURCES of Tables and Figures
Table 1, 2, Figure 1, 4-6, 8, 9: Masaru Tanaka (Author)
Figure 2: United Nations (1970), Skopje Resurgent, p.95, “Kozle and Taftalidze settlements, prefabricated buildings from various Yugoslav Republics and from Czechoslovakia, Finland, France, Italy, Poland, Romania and the United Kingdom”
Figure 3: Document on Skopje Earthquake, No.2873, “Pregled za raspredelba na stanovi na opštinskih sobranija (meaning, the distribution of the dwellings on the local assemblies)”, June 4, 1964, Skopje City Archive
Figure 7: Owned by the interviewee.

Figure 9 Heiwadai Prefab-Public Housing Estates (1966) in Niigata