

Flexibility in the Density Metabolism: Freedom in a Large Complex

BY SOUHEI IMAMURA

To find multiple possibilities and to create livable spaces in an extremely dense condition – that is what Japanese contemporary architects are particularly good at. Most of Japanese architects start their career by designing small houses in an urban environment; it is a good exercise for young architects to develop their design skills. The mini site and chaotic surroundings are far from an ideal condition; in fact it is a poor environment. But the architects come to learn that from this disadvantaged condition they can do something innovative.

Need for Land: the Situation in Japan after the WW2

In Japan, just after the end of the World War, we needed a lot of space for housing. The requirement for a large number of houses was the same in European countries at that time, however, the situation in Japan was unique. 2.7 million houses were lost or damaged and 215 cities were damaged by the war. 30% of the Tokyo city was destroyed by fire. It was said that it needed a half century for Japan to recover and reach the pre-war level. The recovery, however, was achieved much faster actually, thanks to the “miraculous” rapid economical growth throughout the 1960s and the 1970s.

Although the speed of construction of the country was extremely high, it was not fast enough to meet the demand. At the end of the war, we had millions of homeless people, and in addition we had people returning from battlefields and colonial territories. The Japanese imperial state expanded its land, incorporating neighboring regions into its territory. But in 1945, we lost all these colonies, from which many Japanese returned. Japan is a small country, of which 80% of its territory is mountainous. The plains and valleys, more suitable for habitation, are quite limited. The thriving economy from the 1950s greatly helped the recovery of the country, but it also raised the birth ratio as well¹. As a result, the challenge in Japanese cities was to place a very large population into a limited space. This predicament immediately resulted in a hyper dense space. Furthermore, this dense space was very dynamic not only because of the population increase but also because of the population mobility.

A city mirrors the society. Our society changes from time to time, and the city has to respond to them. Hyper dense and dynamic urbanism was not the only factor. The city had to be flexible. The Metabolism movement emerged from the combination of these factors: density and flexibility.

Metabolism

The Metabolism group was first formed on the occasion of the World Design Conference, which was held in Tokyo in 1960. The group was not a spontaneous gathering like Archigram in London. For this important international event, the Metabolism members (called Metabolists) were assembled. Some of them did not know each other before this occasion.

They published a 90-page booklet, titled *METABOLISM/1960*, which was prepared for distribution at the conference. This was in fact the only work on which all the members worked together. The booklet opens with a short manifesto:

Metabolism is the name of the group, in which each member proposes future visions of our coming world through concrete designs and illustrations... The reason why we use such a biological word, metabolism, is that, we believe, design and technology should denote human vitality. We are not going to accept metabolism as a natural historical process, but we are encouraging active metabolic development of our society through our proposals².

The main concept of Metabolism is rather simple. The architecture or the city must be as changeable as a natural organization. But this idea is radical as an idea for architecture or urbanism. As the Pyramid in Egypt or the Parthenon in Greece, eternity is a most essential feature of great examples in the Western architectural history. An architect presents a “work” as a complete piece — not to be changed. Some architects have indeed sought to create a “complete” city as we see in the case of Andrea Palladio’s *Villa La Rotonda*.

Metabolism is presented from the beginning as the opposite to such quest for eternity or timeless perfection³.

As mentioned above, in the 1950s we needed to create a vast new land for residences in Japan. Metabolism went as far as to propose a land in the sky or on the ocean. The main question, however, certainly remained providing houses and buildings for a large number of people in a densely populated space.

Projects of Metabolism

Here I introduce the works of Metabolism from the viewpoint of density and flexibility.

Kiyonori Kikutake (1928–2011)

For such an explosive increase of the population, who could guarantee the space of “living” for everybody? It may be said that it is time to depart from a horizontal city, where the buildings stand lower than tree. (Tokyo is a horizontal city having approximately one and a quarter floor high)⁴.

1958 was the debut year for Kiyonori Kikutake as a major architect. In this year, he designed three major works: “Sky House”⁵, “Tower Shape Community” and “Marine City.” Here, we focus on the “Tower Shape Community”.

The “Tower Shape Community” consists of cylinder shaped skyscrapers, and its construction is conceived as follows. First, before the tower is built, factories on the ground produce the materials for the towers. Then, the construction of the tower begins, raising the towers higher and higher. This is followed by the production of capsule units for family residence, to be installed on the surface of the cylinder towers from the bottom to the top floor, one after another. This tower would be a self-growing system like a natural organism⁶.

The height of the designed tower was 300 m, and the diameter of the cylinder 50 m. It is supposed to have 1250 units installed on the tower’s surface. That is, if each family has 4 members, 5000 people may live in this one skyscraper.

Kikutake characterized the surface of the cylinder as a building site on a vertical land.

A new artificial land should be planned. By using such a wall, humans are able to challenge height. The vertical development of a city space is a proposition to this world. In order to use such a wall, it must be studied and be solved the problem how to live in such a wall⁷.

Kisho Kurokawa (1934–2007)

A city is eternally moving as a container of future life. There are different changing cycles for different sections of the city⁸.

When Kisho Kurokawa was invited to join the Metabolism group in 1959, he was only 25 years old, still a student in the University of Tokyo. Of course he did not have any project realized yet, but Kikutake and Kurokawa came to be known as the two main figures of Metabolism.

The most symbolic Metabolism project by Kurokawa is the Nakagin Capsule Tower Building (1972). About 160 small capsules (approximately 2.2m × 2.2m × 3.8) covers two central vertical shafts. Each capsule was prefabricated in the factory and installed at the site. Theoretically, the capsules are movable (although, unfortunately, none has been actually moved). Movable capsule quickly became a quintessential vocabulary of Metabolism (also of Archigram). The super mini capsule is the result of hyper dense city and all devices for dairy activities are packaged in a small unit.

The Nakagin Capsule Tower Building has been published widely as an icon of Metabolism. That is because it appears as a pure realization of a Metabolist concept⁹.

Fumihiko Maki (1928–)

Fumihiko Maki did not design many projects under the name of Metabolism, unlike Kikutake and Kurokawa, but he made available two critical concepts for urban complex. One is “Collective Form” and the other is “Golgi Structure”.

“Collective Form” was published in the Metabolism booklet in 1960 as a collaborative project with Masato Otaka. They understood the modern cities as below.

Compared with ancient and medieval cities, modern cities are characterized by:

- i) The coexistence and conflict of amazingly heterogeneous institutions and individuals.*
- ii) Unpredictably rapid and extensive transformations in society¹⁰.*

Based on this understanding, they introduced the argument that “collective form” was required and suited for today’s large and complex cities. Opposed to a simple shape building, which is designed by one architect, the “collective form” is literally a complex of different forms; it might be designed by plural designers and will be modified according to the time¹¹.

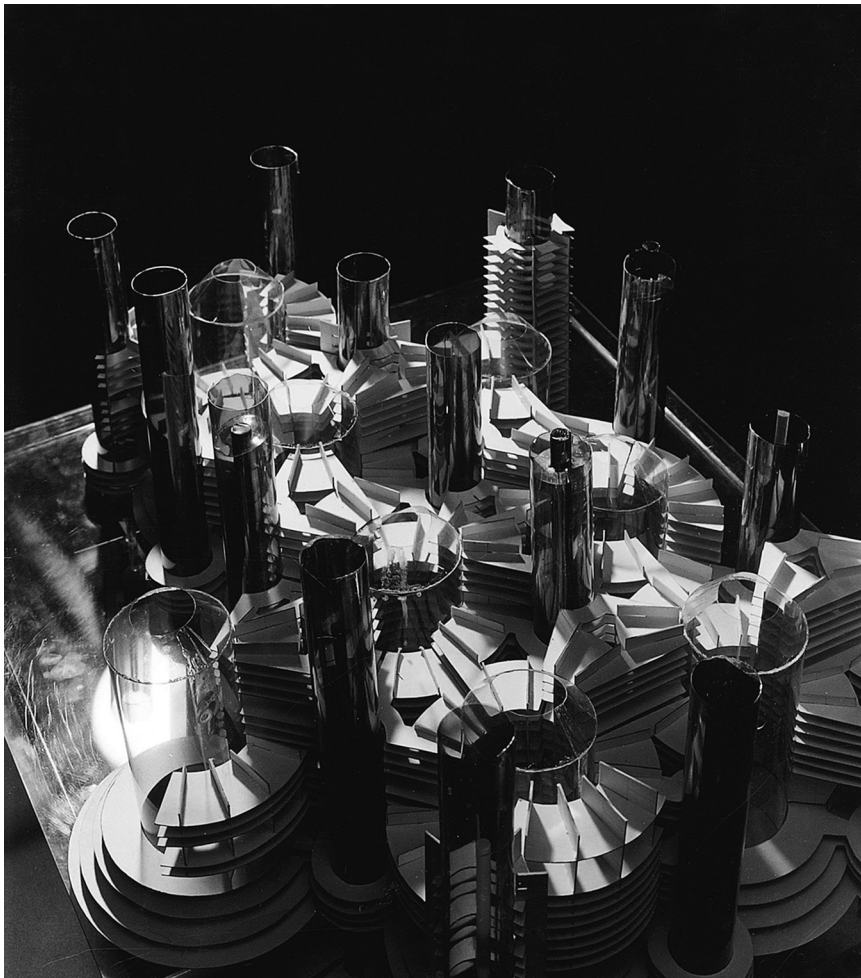
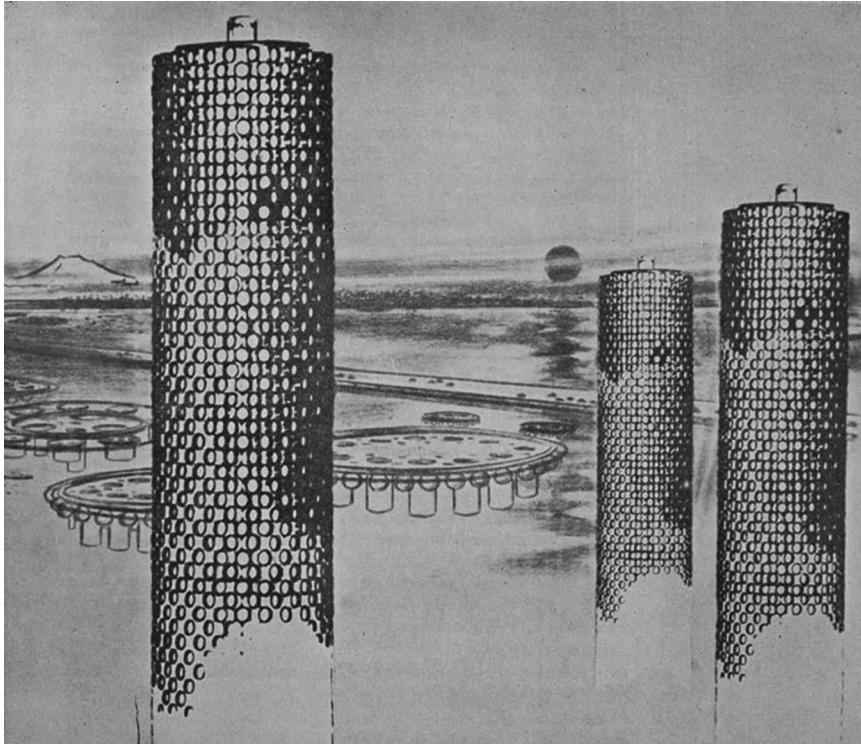
“Golgi Structure”, published in 1967, has a sub-title “High Density City”. Maki argues that when the city keeps being developed further, a mass of buildings occupies the urban space, leaving limited free spaces. In such an environment, we have to think about voids, which are by-product, like gaps between the large buildings. Maki argued that these urban voids would be utilized as a public space for the people and it is necessary to investigate it.

Masato Otaka (1923–2010)

When the Metabolism group was formed, Masato Otaka was on the staff of Kunio Maekawa, a master of modernism architecture in Japan, and Otaka was known as a chief architect of Maekawa’s masterpiece “Tokyo Metropolitan Opera House”. Because he was already an experienced architect, he was the realist among the Metabolists. While Metabolists have been quite often criticized for being too optimistic, Otaka, ever a sober architect, was an exception.

In contrast to many of Metabolists’ urban skyscraper projects, Otaka built low-storied dense urban projects, called “Sakaide Housing Complex” (1964–74). Otaka

01 Kiyonori Kikutake, "Tower Shape Community", 1958. © Kikutake Architects. © Miles Glendinning, 2011.



02 Fumihiko Maki, "Golgi Structure", 1967. © Fumihiko Maki.

settled a concrete slab above the ground at 5.3 m height, and scattered housing blocks on top of this artificial ground. Underneath, the slab was left for future development; it has been used for retail shops and parking. The lifted concrete floor is supported by massive concrete columns, which are laid out on grid, but the upper elements are arranged freely from the system below.

Otaka also designed a super high-population complex, Housing Estate Motomachi and Choju-en (1972–76). The site of the project is in the center of Hiroshima city and it was a redevelopment project for barrack houses area affected by the Hiroshima Atomic Bomb. This complex has 4,500 apartments for 12,000 people. The population density reaches 1,400 people per hectare. Housing blocks, as high as 20-story buildings, are laid out in a zigzag shape, connecting the roofs of the buildings, which are designed as public parks¹².

Kenzo Tange (1913–2005)

Kenzo Tange was not a member of the Metabolism. However, he was the direct mentor of Kurokawa, Maki, and Isozaki at the University of Tokyo, and he was the leading figure of Japanese architecture at that time. So, Tange was the father figure of the Metabolism in many senses. Metabolism was significantly influenced by Tange, and, in fact, the Metabolism influenced Tange as well. They had the common understanding about contemporary cities and shared certain design methods and design motives.

Most Metabolism projects by Tange were the “Yamanashi Broadcasting and Press Center” of 1966. In this complex, vertical cylinders, called cores which is for circulation and services, are laid out on a grid plan, and horizontal office floors are spanned between the columns. This building has a clear system, comparable to Louis Kahn’s served space and servant space. Tange stated that it also has adaptable system for future addition. In fact, this building added floors twice later. This flexibility is a distinctly Metabolism idea¹³.

Tange had developed this idea in a much larger scale in the “Redevelopment Plan for Tsukiji District” project, in 1960–64, designed in the middle of Tokyo. This ambitious project was not realized because of its excessive budget. If it has been actually built, however, it might have been a monumental mega scale urban complex from this period. Tange pursued the possibilities of super dense office complex in the city, and in his plans the future flexibility was critical.

Interestingly, Yamanashi, Tsukiji, and another project called “Shizuoka Press and Broadcasting Center in Tokyo” (in 1967, although it is very small, this realized project has also a clear vertical core and a horizontal floor system), all three projects were the headquarters of media companies (broadcasting, advisement and newspaper). A half century ago, Tange foresaw that information would become dominant in our society and that architecture and city must be designed to fit this new trend¹⁴.

Density and Metabolism

In his book *Collage City*, the architectural critic Colin Rowe juxtaposed two urban plans: Le Corbusier’s “project for

Saint-Die, figure-ground plan” and “Parma, figure-ground plan”. Corbusier’s plan looks rather white and Parma’s plan looks rather black (in the figure-ground plans, the buildings are painted in black). Most part of Parma town is occupied by buildings and has narrow paths. In contrast, Corbusier’s town has large open spaces, with building scattered quite arbitrary. The modernist idea of urban planning thought that the Corbusier style was ideal, but tourists have found Parma’s to be more interesting and fun¹⁵.

Corbusier denied the density of Paris apartment block, which is of the 19th century; it is environmentally poor, lacking light and fresh air. Corbusier proposed free-standing buildings in the middle of an open space for people’s healthy life. The architect arranged the buildings in a well-balanced arrangement in an open field in a rather arbitrary manner, even with some playful gestures. But once these urban configurations were determined, it turned to be a creator’s work piece, sometimes even as a grand master’s monument. It seems it is not allowed to touch the aesthetic of the designer. The city is frozen. It pretends to have a room for further transformation, but it does not. Therefore, the next generation of CIAM architects sought to introduce moving elements in the urban planning.

Metabolism tried to go further. There is no large open space in a contemporary city in reality. So hyper dense condition is inevitable, but the flexibility becomes necessary.

Today, a half century after the birth of Metabolism, the mega-city has become a more and more problematic issue. The population of the world is still rapidly increasing, and the ratio of urban habitation continues to grow. There are many of mega-cities, most of which did not even exist in the last century. The speed of urban transformation is extremely rapid. If we think that we need to consider how we can cope with this situation, then probably we can learn Metabolism and its distinct ideas. ■

Notes

- 1 In a quarter century after the ww2, the population of Japan increased more than 31 million people. The Japanese population was 72,147,000 in 1945, and 103,720,000 in 1970. The population in the Tokyo City was 3,488,000 in 1945, and 11,408,000 in 1970. These data are from the Statistics Bureau, Ministry of International Affairs and Communication.
- 2 *Metabolism 1960: the Proposals for a New Urbanism*, Tokyo, Bijutu Syuppan Sha, 1960, p. 5.
- 3 Tange, Kikutake and Isozaki commonly confessed that the memory of radical social change and scenes of deserted cities after the ww2 are the foundation of their career as architects. They could not believe the eternal world any more, but at the same time they were the witness of the lively rebirth of the society.
- 4 *Metabolism 1960: the Proposals for a New Urbanism*, op. cit., p. 15.
- 5 Kikutake’s own house “Sky House” has a square floor, lifted up in the sky. He proposed a floor in the air, where it is free from dense ground (or messy reality). This motif was repeated and developed thorough all Kikutake’s career. For example, you can see the same idea in these later projects, “Competition Plan for Kyoto International Conference Hall” (1963), “Hotel Toko-en” (1964) and “Edo Tokyo Museum” (1993). Kikutake believed that making a new ground is one solution to create a new site for the building in the city.
- 6 *Metabolism 1960: the Proposals for a New Urbanism*, op. cit., p. 80.
- 7 Kikutake developed the project “Tower Shape Community” several times later. One of the model shows when the tower ends its life, it is abandoned in a deep sea, as if it is a dead animal body.
- 8 *Metabolism 1960: the Proposals for a New Urbanism*, op. cit., p. 17.
- 9 Time-consideration was essential in Metabolism. However, some



03 Kisho Kurokawa, "Nakagin Capsule Tower Building", Tokyo, Japan, 1972. © Souhei Imamura, 2010.

Metabolism project showed this concept as a gesture. Typical example is Kurokawa's Nakagin housing tower. It is easy to understand the idea of the project, because the changeable small units are quite visible, but it never really transfers its form. Isozaki's super-spanned cantilever in the Sky City project, gives you an unstable feeling. This effect is opposite to the stability of Pyramid, eternal architecture.

- 10 *Metabolism 1960: the Proposals for a New Urbanism*, op. cit., p. 58.
- 11 Maki's argument of large scale urbanism and its complexity, later echoed in Rem Koolhaas's polemical essay "Bigness" (Rem Koolhaas, "Bigness: or the Problem of Large" in *SMLXL*, Rotterdam, 010 Publisher, 1995, p. 495–516). "Beyond a Certain critical Mass, a building becomes a Big Building. Such a mass can no longer be controlled by a single architectural gesture, or even any combinational architectural gestures." *Idem*, p. 499.
- 12 When Otaka was a staff of Maekawa, he was also in charge for the project "Multi-Story Apartment House at Harumi", completed in 1958. This was the first high-rise concrete housing in Japan, commissioned by the Japan Housing Corporation, a government-affiliated corporation. 10 stories building were built on the reclaimed land in the Tokyo Bay. As Otaka admired Le Corbusier, he tried to mix the programs (residential, commercial, kids play space and an open space), following Le Corbusier's *L'Unité d'Habitation de Marseille*. Unfortunately the Japan Housing Corporation did not accept Otaka's vision and only the residential was allowed in the building. This apartment building adopted a mega-structure system. The thick concrete frames contained 3 stories of 6 apartment unit, which allows future renovation of inner apartments. Metabolism-like idea of future flexibility in a dense complex was already challenged in this project.

- 13 The project architect of this building was Arata Isozaki. He did not belong to the Metabolism group, but some of his projects has apparent Metabolism feature. For example "Shibuya Project: City in the Air" in 1962.
- 14 Almost all historical description of Tange-Metabolism ends their narrative with the Expo '70 Osaka, the first world's fair in Japan. Tange was appointed as a designer of the master planning of the World's Fair site and he also designed the main facility called "Festival Plaza" (project of Isozaki again). Though the scale of the construction was huge, its space frame structure (292 m long and 108 m wide) was lifted up in the sky (height of 37,7 m), but underneath the gigantic roof there was nothing. As Tange forecasted that information became the central matter of the city, in this national event there was not concrete content, but there is program for the serious of events. So, contradictory to the pursuit for the high density, at the end, Tange designed a huge empty space.
- 15 Colin Rowe and Fred Koetter, *Collage City*, Cambridge, The MIT Press, 1978, p. 62–63.

Souhei Imamura

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