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From Utopia To Reality: Group-Form Megastructure

从乌托邦到现实: 群体式巨构



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Abstract

In the evolution of megastructure, the ideas mainly remain as utopian rather than putting the research into practice. In the present time which mega is becoming a reality, exploration of design issues towards practical application is needed. Based on the case studies, the paper classifies the mega into two types: Integral -Form and Group-Form, figuring out Group-Form mega could be regarded as a compromised form between the classic "Utopia" and the group high-rise buildings, which is more likely coming into reality at the present stage. The paper analyzes possibilities of establishing a complex urban space system by sky streets and secondary grounds, to provide diverse space for daily life, and explores its positive social significance for solving the social problems such as separation of living and working, the adaptive changes of community organization system in the period of fast urbanization.

Keywords: Megastructure, Typology, Space System, Sky Streets, Social Organization

摘要

在巨构思潮的演化中，多数建筑师的构想停留于乌托邦阶段，却并没有实现真正意义上的设计和建造。在巨构建筑成为现实需求的今天，亟需对于面向实践应用的设计策略的探讨。本文试图在国内外已有研究成果的基础上，将巨构划分为相应的类型：整体式和群体式，指出群体式巨构可作为传统乌托邦式巨构概念与现有高密度集群建筑的妥协形式，也是巨构在现阶段最有可能走向实践的形式。论文分析了通过空中街道和次级地面建立起多样性城市空间系统以提供丰富的日常生活场所的可能性，探讨了在快速城市化今天，群体式巨构对于解决“产城分离”等社会问题的积极意义以及社区管理系统的适应性转型方向。

关键词: 巨构，类型学，空间系统，空中街道，社会组织

Introduction

The first architect who brought the "megastructure" into architectural vocabulary was Japanese architect Fumihiko Maki. As a member of Metabolism, he put forwards the definition of "Megastructure" in his book "Investigation in Collective Form", and thought the city should have 3 forms: Compositional Form, Megastructure Form and Group Form. He considered the megastructure as "a large frame in which all the functions of a city or part of a city are housed. [This concept] has been made possible by present day technology. In a sense it is a man-made feature of the landscape. It is like the great hill on which Italian towns were built..."

From the 20th century on, the proposals and thoughts of megastructure have been developed rapidly. From Plan O-Bus of Le Corbusier (1930s) to systematic discussion of Mega-structure by Fumihiko Maki (1960s), the series of ambitious imagination of mega-structure by Archigram and Metabolists (1960-70s) until Koolhaas, Norman Foster and MVRDV's conceptual design presently, but there has hardly been a pause on the dream in chasing mega-structure.

引言

最早将“巨构 (Megastructure)”纳入到建筑学词汇中的是日本建筑师槇文彦。作为“新陈代谢”运动的成员，槇文彦在其《集合形象调查》中率先提出了“巨构”的定义。他认为城市有三种原型——组合形式、巨构与集团形式。其中巨构型的城市系指“一个大型的架构，其中容纳了所有或者部分的城市功能，它已经能够为今日的科技所建造，某种意义上它是一种人造的景观，正如意大利的山城一样。”

20世纪以来，巨构思潮发展十分迅速。从柯布西耶的阿尔及尔的城市化方案A到槇文彦1960的巨构，再到建筑电讯派和新陈代谢派的富有想象力的巨构方案，直到今天的库哈斯、诺曼福斯特和MVRDV概念设计，对于巨构梦想的追逐从未停歇。

本文将巨构划分为整体式和群体性两种类型，并将群体式巨构视为一种妥协形式，即现阶段最有可能走向实践的形式。

巨构类型的划分

从形态关系的角度上看，巨构可以分为整体式和群体式。整体式巨构即传统的经典意义上的巨构，具有革命性的意味。这样

This paper classifies the mega into 2 types: Integral -Form (horizontal and vertical) and Group-Form. Group-Form mega could be considered as a compromised form between the classic "Utopia" and the group high-rise buildings, which would be more likely coming into reality at the present stage.

Types of Megastructure

From the perspective of morphological relations, mega could be classified into two types: Integral-Form and Group-Form. The Integral Form is the classic megastructure and it has a revolutionary meaning. Integral-Form Mega is composed of a permanent structure occupied by the dominant position (as "trunk") and several replaceable modulus units (as "leaves") (see Figure1). The whole building affords for part or all of the city's function.

It should be noted that, Group-Form Mega is different from the group-form modeling which Fumihiko Maki has put forward. As Figure 1 denotes, Fumihiko put forward three forms—Compositional-Form, Mega-Form and Group-Form. Mega-Form is a top-down organization from the main structure to units, while group-form modeling is an organization from bottom to top, which the order is originated from the grouping process of several units. In the diagram for mega from Fumihiko, we can consider mega as a trunk with branches. The branches can be replaceable while the trunk is the main structure. Mega as this can be considered as Integral-Form.

The Group-Form Mega in this paper is enlightened by Fumihiko, but it is the realization form of mega, rather than a concept coexisting with mega. There is no dominant structure in Group-Form Mega. Several relatively independent building groups are mashed up with each other through space to support urban function.

In the late 20th and early 21st century, Integral-Form Mega has been the main stream of the creation. It could be understood as both Vertical Integral-Form and Horizontal Integral-Form and the function was relatively compact. However, as an integral-Mega supports thousands of people, the volume must be huge, and the safety problems such as earthquake prevention would be obstacles for their implementation.

1. Vertical Integral-Form Mega: Extreme solution of high density and high-rise as a variant on current skyscrapers. The main space type is liner and relate to the open public space. People are far off ground and difficult to activate public communication.
2. Horizontal Integral-Form Mega: It could be considered as a skyscraper lying down, which is low-rise and high density with extensive coverage, such as slums in Southern Asia. Comparing to vertical form, it is close to ground but is not very helpful to land-saving.
3. Group-Form Mega: It uses horizontal air streets in different height to connect buildings, makes the building group into a whole to load the urban function. Typical cases such as Modern MOMA by Steve Holl, can be seen as a compromising form of mega and group-form buildings(see Figure2,3). The related technologies are matured, and the form is good for sunshine and ventilation, so that it could be considered as the possible form for the implementation.



Figure1. Diagrams of Compositional-Form, Mega-Form and Group-Form. Source: Lin, Zhongjie. "XL and XS: Japanese Architecture and Urbanism in the Post-Metabolism Era." *Urban Flux*(2013):8-12.

图1. 图解组合形式，巨构形式和群形式

的巨构由一个占据主体地位的永久性结构 (可以理解为“树干”) 和若干可替换的模数单元 (可以理解为“树叶”) 组成 (如图1)，由整幢建筑承担部分或者全部城市功能。

需要注意的是，群体式巨构与桢文彦提出的群造型是不同的。如图1，桢文彦将建筑分为组合形式、巨构形式和群形式。巨构形式是一种自上而下，先主体结构再单元元素的组织，而群造型则是自下而上的组织，其秩序来自多个单元体组化的过程。在桢文彦最初对于巨构的图示中，我们可以将巨构理解为长有许多枝丫的树干，枝丫是可替换的，而主体形式则是树干，这样的巨构可以理解为是整体性的。

本文所提出的群体式巨构受桢文彦的群形式理论启发，但与桢文彦提出群形式概念不同，并不是作为与巨构并存的另一概念，而



Figure 2, 3. Perspective of Modern MOMA. Source:Yangxu.

图2, 3. 当代万国城透视

Table 1 is about the classification of part of megastructure's concepts or practices influenced by relevant ideas. It should be noticed that, though part of built cases are not "real" megastructure they still could be regarded as Group-Form or Integral-Form from perspective of configuration.

Group-Form Mega: A Compromise of Traditional Mega with High-Rise Building

In the trend of increase of urban density, huge buildings are built one after another, but the Integral-Form megastructure is still difficult to achieve. The reason is, on one hand, inhabitation is the necessary function in the megastructure while the policies and regulations are strict for sunshine and ventilation on the residence, which the Integral-Form cannot fulfill. On the other hand, the Integral-Form is too expensive, so that it greatly challenges the developers' capital turnover in the market economy.

So today's Integral-Form buildings are shown up as stadium, television center and exhibition center which are led by government, with single function and some kind of symbolic meanings, such as the Bird Nest and China Pavilion. As the function is simplex, they cannot afford city's function, so they can be called as "huge" structure rather than mega. There is still a long journey on the way to "real" Integral-Form Mega.

Comparing to the aforementioned, Group-Form Mega would be more closely tied to implementation. Relatively detached buildings could provide ample sunlight and ventilation. Examples of group-form mega such as MOMA having achieved success, people become more interested in this kind of configuration.

Though Group-Form Mega means high density and compact, it does not equal to high-density group buildings. To realize the tridimensional space, horizontal connections are made in the air in the form called "sky street". Since the appearance of 3-D space, boundaries between single buildings in the Group-Form Mega are no longer clear, and buildings blend with each other through public space (see Figure 4). Meanwhile, the horizontal system in the air becomes extremely important part of the sharing infrastructure.

Differences Between Sky Street and Skybridge

The sky streets are different from the skybridges. The skybridges are widely used in the high-rise building and urban design, such as the Petronas Towers, which the skybridge connects at the 41st and 42nd floor. The role of skybridge provides possibilities of view deck for tourists, and improves the building evacuation. In Central District, Hong Kong, the skybridges at second floor link the different buildings, integrating urban flow into high-density commercial systems.

Different with skybridge, the sky street originates from the "streets" in Unite d'Habitation Marseilles, and Le Corbusier wanted it become the sharing space in the vertical dimension. In Group-Form megastructure, the sky streets' function is not only limited in traffic and evacuation. They could afford the function of neighborhood businesses, clubs, and health care facilities, becoming the public center in the air.

Some architects and critics think the skybridge system would weaken street life and pedestrian activity. Urban planner William Whyte once

	Name	Designer	Year	Status	Classification	Image
1	100-Floor Building	Theodore Starrett	1906	Concept	Integral-Form	
2	Utopia in Air	A.B.Walker	1909	Concept	Integral-Form	
3	Radiant City	Le Corbusier	1922	Concept	Group-Form	
4	Wolkenbügel	El Lissitzky	1924	Concept	Integral-Form	
5	Algiers Plan	Le Corbusier	1930	Concept	Integral-Form	
6	Marseillais Unite Habitation	Le Corbusier	1952	Built	Integral-Form	
7	The Spatial City	Yona Friedman	1958	Concept	Integral-Form	
8	Tokyo Bay 1960	Kenzo Tange	1960	Concept	Integral-Form	
9	Cities in Air	Isosaki Arata	1960	Concept	Group-Form	
10	Cities on Sea	Kiyonori Kikutake	1962	Concept	Integral-Form	
11	Agriculture City	Kurokawa	1962	Concept	Integral-Form	
12	Yamanashi County Cultural Center	Tange Kenzō	1967	Built	Integral-Form	
13	Shizuoka Press and Broadcasting Center	Tange Kenzō	1967	Built	Integral-Form	
14	Habitat-67	Moshe Safdie	1967	Built	Integral-Form	
15	Capsule Tower	Kurokawa	1972	Built	Integral-Form	
16	Millennium Tower	Foster	1989	Concept	Integral-Form	
18	Mega-city Pyramid	Shimizu	1991	Concept	Integral-Form	
19	Hyperbuilding	Koolhaas	1996	Concept	Integral-Form	
20	Shin Umeda City	Hiroshi Hara	1993	Built	Group-Form	
21	Beijing Modern Moma	Steve Holl	2003	Built	Group-Form	
22	CCTV	Koolhaas	2004	Built	Group-Form	
23	Marina Bay Sands	Moshe Safdie	2010	Built	Group-Form	
24	Hangzhou Civic Center	Li Linxue	2009	Built	Group-Form	
25	The Pinnacle@Duxton	ARC studio	2010	Built	Group-Form	
26	Yinhe Soho	Zaha Hadid	2010	Built	Group-Form	
27	Vertical City	Vantone Company	2010-	Process	Group-Form	
28	Changsha Air City	Broad Group	2011-	Process	Integral-Form	

Table 1. Classification of some megastructure's concepts or practices in the history.
Source: Yangxu, Huang Yiru

表1. 历史上部分巨构概念或实践分类

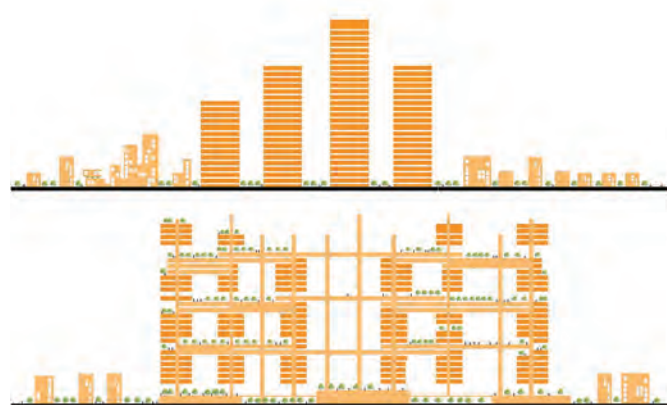


Figure 4. Differences between high-rise buildings and Group-Form Mega. Source: Yangxu, Huang Yiru

图4. 高密度建筑和群体式巨构建筑的区别

said, "What cities need is more people on the street, not fewer people. When you take pedestrians away from ground level, you take away what makes a street work." However, the sky streets of megastructure are to reshape the possibilities of traditional street life for the air, where there are almost no any public street activities in the past. The horizontal connections are not just in the bottom of buildings, but also in the middle and top, which are different than the skybridge system of Minneapolis and Hong Kong.

Meanwhile, the sky streets provide the possibilities of "Secondary Ground". The skybridges are always sealed to guarantee safety, which apart from being a factor to influence the quality of public activities also detracts from the space available on their roofs. A possibility is the sky streets are still sealed but their roofs could be used as a "Secondary Ground" to be used as neighborhood parks or other platforms (see Figure 5), satisfying human natural characteristics to associate with nature (The Highline Park could be thought as typical case about "secondary ground" though it is not a roof of a sky street).

Urban Space System of Megastructure

Figure 6 is an analysis diagram of a block in traditional horizontal city: squares, main roads, paths and so on make the space full of physical and cultural diversity. The Group-Form Megastructure is the vertical superposition and reproduction of horizontal cities: relatively independent monomer can be divided into several mutually independent sections, while blending these independent sections provides possibilities for horizontal dimension's connection.

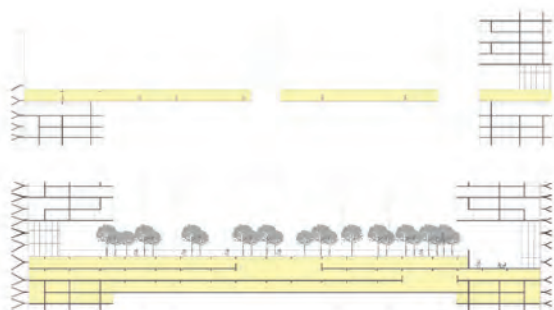


Figure 5. Top: the skybridge is always seal and its main function is traffic and evacuation. Its roof is always unavailable.

Bottom: Sky streets of Group-Form Megastructure. The streets could afford urban function, such as restaurant, neighborhood club and entertainment etc and their roof could be used as "secondary ground". Source: YangXu, Huang Yiru.

图5. 上图: 空中天桥是密封的, 它的主要功能是交通和疏散。它的屋顶是不能上人的。

下图: 群体式巨构的空中街道。空中街道能够承担城市功能, 比如餐馆, 邻里俱乐部和娱乐设施。它们的屋顶能够被用作"次级地面"。

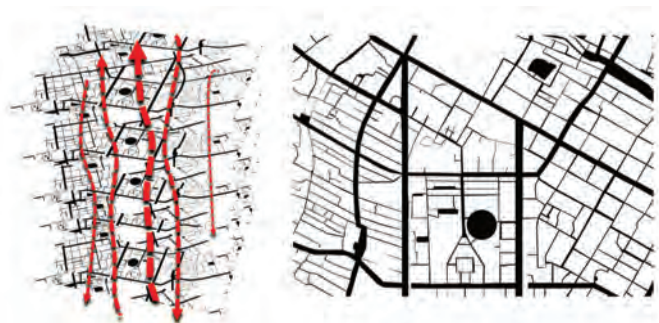


Figure 6. Group-Form Mega is the vertical superposition and reproduction of horizontal cities. Source: YangXu, Huang Yiru.

图6. 群体式巨构是水平城市的叠合和重现。

是巨构类型中的一种实现形式。在群体式巨构中, 巨构并不存在一个统治性的结构, 而是由若干相对独立的建筑群体通过空间的相互糅合形成整体。

20世纪末期和21世纪初期建筑师对于巨构的探索多表征为整体式巨构, 而整体式巨构可以从本质上理解为横向延伸或者纵向延伸, 功能相对紧凑。然而, 以一栋整体式巨构承载数万人或者十万人以上的城市, 其体型必然巨大, 使得防灾等安全问题不可避免地成为建造的障碍。

1. 垂直整体式巨构: 高层高密度的极致状态。摩天楼的变体, 占地面积小, 层数高, 容纳部分或者整体的城市功能。单纯的线性向上的空间, 居民远离地面缺乏激活公共交流的可能性。
2. 水平整体式巨构: 低层高密度的极致状态。可以视为水平放置的摩天大楼, 低层高密度, 占地面积大, 层数低——亲地性好但不利于节地。
3. 群体式巨构: 高层高密度的折衷状态。通过地面, 高空等立体化的横向联系使单体建筑群成为整体共同分享城市功能。典型案例如霍尔的当代万国城, 可以看作巨构与群体建筑的折衷形式 (如图2,3)。相应的技术已经成熟, 相对独立的单体有利于采光通风, 可以视为是容易成为现实的巨构形式。

表1是部分巨构构想和受巨构思想影响的建造实践的分类。需要注意的是, 虽然部分建成案例并非真正意义上的巨构, 但从形态上依然可以化为整体式或者群体式。

群体式巨构: 巨构与高层建筑的折衷

在城市密度增加的趋势下, 大型建筑相继出现, 但整体式巨构却一直难以实现。究其原因, 一方面, 在巨构的功能中, 居住是必不可少的, 而政策法规对于居住建筑日照和采光通风的严苛要求, 难以在整体式巨构中有效满足; 同时, 整体式巨构花费过于巨大, 对市场经济条件下建设方的资金周转挑战巨大。

目前建成的整体式巨型建筑更多的为体育场, 电视台, 展示中心等由政府主导, 功能相对单一带有某种符号意义的大型建筑, 如鸟巢, 中国馆等, 由于其功能单一, 缺乏城市功能, 只能称为巨型建筑而非巨构。真正意义上的整体式巨构还有很长的路要走。

与前者相比, 群体式巨构则具有更强的实践性。相对独立的单体保证了采光通风, 集群高层建筑的出现人们对于其已经有所认识。当代MOMA等群体式巨构实践的一定意义的成功使得人们对于这种形式兴趣更加强烈。

需要注意的是, 尽管群体式巨构意味着高密度和集约, 但是群体性巨构却并不等于高密度集群建筑。为实现其空间立体化, 群体式巨构往往通过所谓的"空中走廊"或者"空中街道"的形式增强水平联系。由于空间立体化的出现, 群体式巨构中原有的单体建筑界限不再明确, 建筑之间得以通过公共空间糅合在一起 (如图4), 而空中的水平体系则成为共享的公共设施。

空中街道与空中天桥的区别

空中街道并不等同于传统的空中天桥或者空中走廊。空中天桥广泛使用在现有的高密度建筑和城市设计中, 例如吉隆坡的双子塔等, 空中天桥连接其41层和42层。他们的作用一方面提供了游客

In the formation of a Group-Form Mega, the sky streets and secondary ground are key factors. They are always the center of a neighborhood's activity, possibly even one of centers of the whole mega. They could be classified into neighborhood units, commercial units, entertainment units and other special units.

Neighborhood Units: They are mainly applicable in the general neighborhood. The sky streets are used as the management of neighborhood, community nurseries, elderly care centers, community business and restaurants (see Figure 7).

Commercial Units: The sky streets are used as shopping malls or supermarkets. The secondary ground is similar with the neighborhood units, and also used for rest. It needs to add some small business buildings on the secondary ground as additional part for the bottom business.

Entertainment Units: They are mostly on the roof of mega. The functions of sky streets are mostly upscale clubs and restaurants. The vertical parts above the secondary ground are set as hotel. The entertainment units are always the most attractive place for the tourists in the megastructure (see Figure 8, 9).

Other special units: Such as schools, sports court, stadiums, etc. Secondary grounds are only open to air street users, such as playgrounds, rest venues. It cannot be directly arrived by the external vertical transportation (see Figure 10).

As shown in Figure 11, 3 – 4 horizontal circle are provided in the whole mega from top to bottom, encouraging movement about the levels. The vertical transportation could be divided into three kinds: the normal ones, the express elevators which are directly to the public floors and slow elevators for relaxation. They are connected to the ground, and the bottoms are even connected to the railway system.

观光的可能, 另外在一定程度上起到了疏散人流的作用。在香港中环的城市设计中, 位于建筑第二层人行天桥系统将各个大厦之间相互连接, 将都市人群整合进高密度的商业系统中。

空中街道与人行天桥不同, 他最早的构想来源于柯布西耶的马赛公寓的空中街道, 成为人们垂直生活的共享空间。他的功能并不仅限于交通性质, 心。在群体式巨构中, 空中街道可以承担部分社区商业, 邻里俱乐部, 小型医疗服务中心乃至学校。而是人们空中活动的中心。

规划师怀特认为空中天桥系统对于街道的一种削弱。“城市需要的是更多的人在街上, 而不是更少的人。当你将步行带离地面的时候, 你也让街道偏离了正常轨道。”然而群体式巨构的空中街道则希望为远离地面的人们提供在高空中重新街道生活的可能, 是对街道生活的重塑而非削弱。建筑之间的水平连接不仅限于建筑底部, 更多的在建筑中部和顶部。这与香港, 以及Minneapolis天桥系统多数位于建筑的第二, 三层式截然不同的。

空中街道的重要性还在于它提供了“次级地面”的可能。空中天桥为保证其安全性, 往往是封闭的, 这成为影响公共活动的一个因素, 他们的屋顶也是不可上人的。而在巨构中, 空中街道尽管依然是密封的, 但它们的屋面则成为邻里休闲的花园及其他活动场地(如图5), 满足了人们亲近自然的属性(高线公园可以看做是“次级地面”的典型例子, 尽管它并不是一个空中街道的屋面)。

巨构的城市空中系统

图6是作者对于某水平城市一个城市街区的图解, 可以看到广场, 主干道、支路等十分丰富的空间体系, 而在群体式巨构实质上就是这一体系的垂直叠加再现: 相对独立的单体能够被划分若干相互联系又相对独立的区段, 单体之间的互相糅合提供了水平维度上的高空联系的可能。

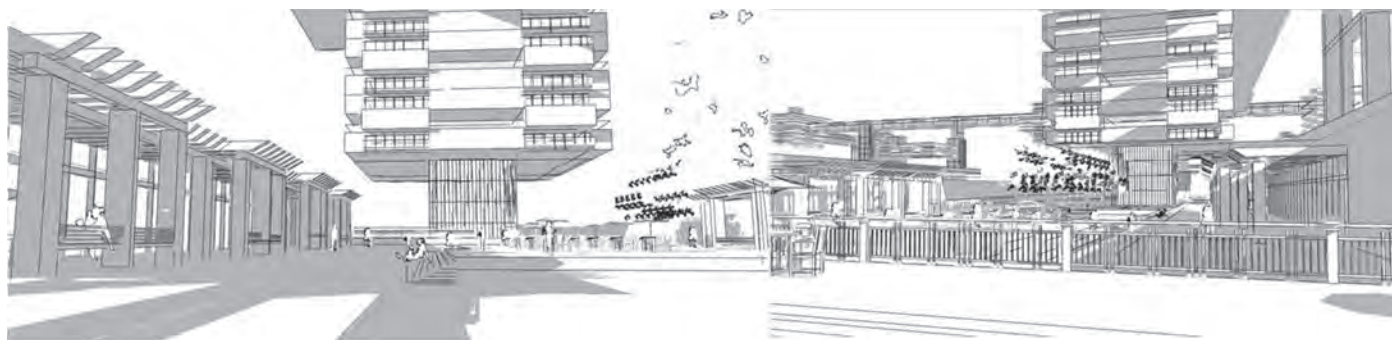


Figure 7. Perspective of neighborhood units' secondary ground. It could be divided into grass, hard pave, wood deck, combining with construction and small buildings. Source: YangXu, Huang Yiru.

图7. 邻里单元次级地面透视, 它可以划分为绿地, 硬地, 木质平台, 并结合小型建筑和构筑物。

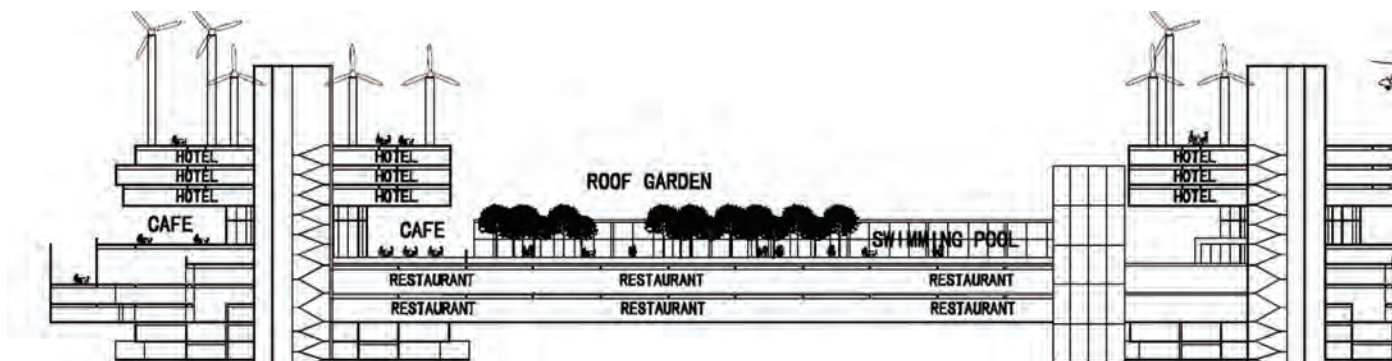


Figure 8. Section of entertainment units' secondary ground. Source: YangXu, Huang Yiru.

图8. 娱乐单元次级地面剖面。

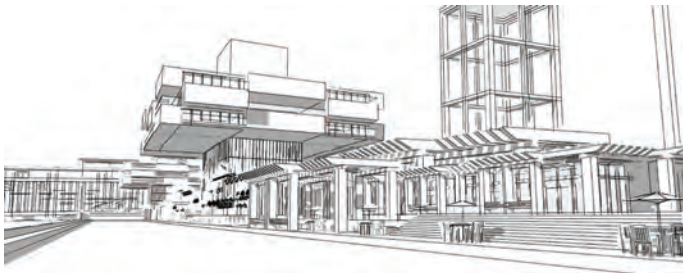


Figure 9. Perspective of entertainment units' secondary ground. Source: YangXu, Huang Yiru.
图9: 娱乐单元次级地面透视。



Figure 10. Section of sports units' secondary ground. Source: YangXu, Huang Yiru.
图10: 运动单元次级地面剖面。

Drive Force and Social Significance of Group-Form Mega

Demands of Urbanization

China is in the period of fast urbanization. The city faces the pressure from a gathering population. The red line of 1.8 billion arable land (1,200,000 hectares) is set for national food security, which makes the land for construction become more and more limited. It means the traditional pie-mode is not affordable in China. The Group-Form Mega provides us a new development mode of high density while ensuring the quality of life.

Technology, Economy and Policy

By and large technical obstacles in the construction of mega have been overcome. Many relevant practices show the possibilities of connections within the air. The continuous effects towards industrialized housing have reduced the difficulties of construction of a megastructure.

With the development of economy in China, major developers already have considerable strength to afford the construction of mega. Because the land in China belongs to the nation collectively, large scale land use for mass projects could be supported with the support of government.

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Combination of Inhabitation and Work and Promotion of Public Communication

Nowadays, the mode of horizontal urban sprawl has caused a lot of problems, such as separation of inhabitation and work. Group-Form Mega is not just a settlement, but takes up an urban function which integrates living, working and relaxing. The compact pattern of "Work and live in a mega" allows people access to the workplace by foot or vertical transportation, and reduces the reliance of private cars. Meanwhile, the Group-Form Mega could shorten the distance between dwellings to the public spaces by multiple public floors in air and promote communication by increasing semi-public space.

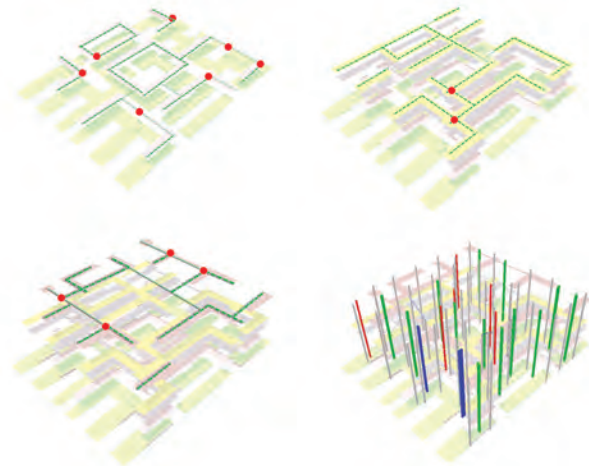


Figure 11. Diagram of Transportation System. Source: YangXu, Huang Yiru
图11: 交通系统图解。

在巨构城市的构成中，空中街道和次级地面是极其重要的一部分。他们通常是整个邻里的中心，甚至整个巨构的中心之一。水平街道和次级地面可根据功能划分为社区性，商业性，娱乐性和特定功能性等。

社区型: 主要适用于一般邻里，空中街道通常为社区物业与管理、社区小型托儿所、老人保健中心、社区小型商业和小型餐饮等(如图7)。

商业型: 主要功能为购物和特色商业。其次级地面与社区性较为类似，亦主要为休憩功能，但在次级地面层增加部分小型建筑，作为其下部空中商业的补充。

娱乐型: 则常见于屋顶层。空中街道主要功能为商业会所和特色餐饮。次级地面设置为大型游泳池，花园和游乐场。次级地面上的若干垂直单元则设置为精品酒店。这样的水平单元往往是整个巨构城市中对于游客而言最具吸引力的场所(如图8,9)。

其他特色功能型: 如学校、疗养院、体育场等。次级地面仅供空中街道的使用者开放，如操场，休息场地等---不能通过外部垂直交通直接到达(如图10)。

如图11，整个巨构城市从上到下可分为3-4个水平环线，水平街道能够环通，鼓励空中步行。此外，垂直交通被划分为三种属性：除正常的电梯外，更增加了直接到达公共层的直达式电梯和与餐饮休闲相结合的慢行式电梯，他们直接与地面相连，底部更直接与轨道交通相连。

群体式巨构的驱动力和社会意义

城市化的需求

中国处在快速城市化的时代。城市则面临着人口大量聚集带来的土地压力。18亿亩耕地的红线被设定为保障国家粮食安全，这也使得建设用地较为紧缺，这也意味着在传统的水平的摊大饼式的发展模式在中国不具有可持续性。群体式巨构提供给了我们保证生活品质前提下高密度发展模式的可能模式。

技术、经济和政策

巨构城市的实践环节中的建造技术障碍已经基本克服，现有诸多巨型建筑实践充分展示了高空中水平连接的可行性，而工业化住宅的持续发展更是提高了巨构建造的可能性。

Relevant Changes of Community's Organization

In China, the means of which neighborhoods organize has been shifting from small, local committees to larger organizations. In the regulations related to community management, neighborhood committees should be in the service of the neighborhood level (100-700 families). From top to bottom the governing system mode is: City, Street or Sub district, neighborhood, then residents group. But due to the city's continuous extension and population expansion, neighborhood committees often are set at the community level (10,000-15,000 people), and it becomes an extension of government. The special governing mode is required by characteristics of megastructure; high density increases the difficulties of management. Thus, in traditional cities some of the functions of community center have to be replaced by urban facilities. It is suggested that neighborhood committee should return to the original neighborhood services unit (100-700 units), forming a management system of megastructure (specialized management committee) – neighborhood committee, which is more flat. This system also emphasizes concepts of top-down (centralization) and bottom-up (self-governance).

The methods of property management should change as well. In the existing method, the residents committee's choose the property management companies separately and these companies in different communities are often irrelevant. But in megastructure, different communities and neighborhoods are always connected each other and also influenced by each other. It is more like a highly integrated technology product – once the problem occurs in a part of the system; it is difficult to bear for the entire renovation and maintenance by the independent company. Therefore, it calls for a systematic property management of the whole megastructure. The mode has to be changed from the parallel management in the past into more crosswise management systems.

Summary

This paper classifies the "megastructure" into Integral-Form Mega and Group-Form Mega. As a compromised configuration between the classic "Utopia" and the group high-rise buildings, the Group-Form Mega makes the individual buildings indistinct by the horizontal connections. In the period of fast urbanization which demands a large amount of construction land and residential units, the Group-Form Mega has a positive social significance. At the same time, it could promote the public communication while it could also be helpful for solving the problems of separation of inhabitation and work by transforming the community organizations.

随着经济的发展，大型开发商已经具备了足够的经济实力支持这样的大型项目，此外，中国的土地属于国家，大型项目的大规模用地能够得到政府的支持。

产城一体和对于公共交流的促进

现有的城市“摊大饼”式的发展模式造成了诸多问题，造成了“产城分离”的诸多问题。群体式巨构其功能不仅仅是单纯的住区，更是承担了部分或者全部的城市功能，能够将居住，休闲和工作相融合，有效实现居住与就业之间的平衡。“产城一体”的紧凑的布局使得人们能够通过步行和垂直交通既能到达工作地点，减少了人们对于私家汽车的依赖。此外，群体性巨构设计可以通过设置多基面的空中公共空间，缩短人们达到公共空间的距离，在居住单元中增加空中宅院等半公共空间来促进公共交流。

社区组织的相应变化

在中国，社区管理模式也经历了管理规模从小到大的变化。居委会的设置是一个邻里自治的单位，应该是服务于邻里级的（100户-700户），其自上而下的管理模式为：城市——街道（居住区级）——无（居住小区级）——居委会（居住组团级）——居民小组（虚化，楼长）。但由于城市规模的不断外延和人口的增多，街道规模扩大，居委会往往设置为社区级（10000-15000人）规模，居委会由社区自治机构变成了政府的延伸。巨构城市的特性决定其管理模式特殊性。高密度增加了管理的难度，传统社区的公共服务功能更多地会被城市设施所代替。而在巨构城市中，居民委员会的职能重新回归原有的邻里服务单元，在原有的居住组团规模中促进邻里委员会的建设，并加强对于业主委员会、民众社团等自发性的群众团体的建设，形成巨构城市（专门的管理委员会）——邻里委员会和群众团体这样的两元体系，管理更加扁平化，强化邻里的重要性，强调自上而下和自下而上相结合。

物业管理模式同样也会发生相应的转变。在现有的管理体制下，居住区的物业管理往往由其业主委员会选择物业公司，再授权物业公司进行管理。城市中若干个居住区之间的物业管理之间往往是互不相干的。但在巨构城市之中，与水平城市之间通过道路、围墙形成的自然隔离不同的是，各种邻里、社区之间从形态上是相互关联的，从空间上也是相互影响的。高密度复合的巨构城市更像是一个高度集成的技术产物，一旦某个环节出了问题，相互独立的物业管理系统很难承担起对于全局的整修和维护，因此更需要对于整个城市的物业管理的统筹集中，其管理模式也由过去的平行管理转为交叉管理的系统化模式。

总结

本文将巨构划分为整体式和群体式。其中群体式巨构作为传统乌托邦式巨构概念与现有高密度集群建筑的妥协形式，通过地面，高空等立体化的水平联系，模糊原有建筑单体概念，因而在快速城市化亟需大量建设用地的今天，更具有实践意义。同时，通过社区管理模式的转化，对于促进公共交流，解决“产城分离”等社会问题可以产生积极意义。

References (参考书目):

Banham, R. (1976) **Megastructure: Urban Futures of the Recent Past**. San Francisco: Harper & Row.

Dong, C. (2012) **Architecture to High Density**. Beijing: China Architecture & Building Press.

Godden, J. (1995) "Expect City To Roll Over For Skybridge," Seattle Times, July 2, 1995.

Huang, Y. & Zhu, P. (2012) "Mega Structure: Evoking Dream for Future" (paper presented at the annual meeting for Asia Vertical City, Singapore, July 7-9, 2012).

Lin, Z. (2013) "XL and XS: Japanese Architecture and Urbanism in the Post-Metabolis Era." Urban Flux: 8-12.

Qi, Li. (2009) "Megastructure and Influence to Modern Architecture" Master Diss., Southeast University.

Yao, D. & Yiru H. (2011) "Megastructure: Megastructure of 100 000, Studio Course and Reflections." Time+Architecture: 62-67.