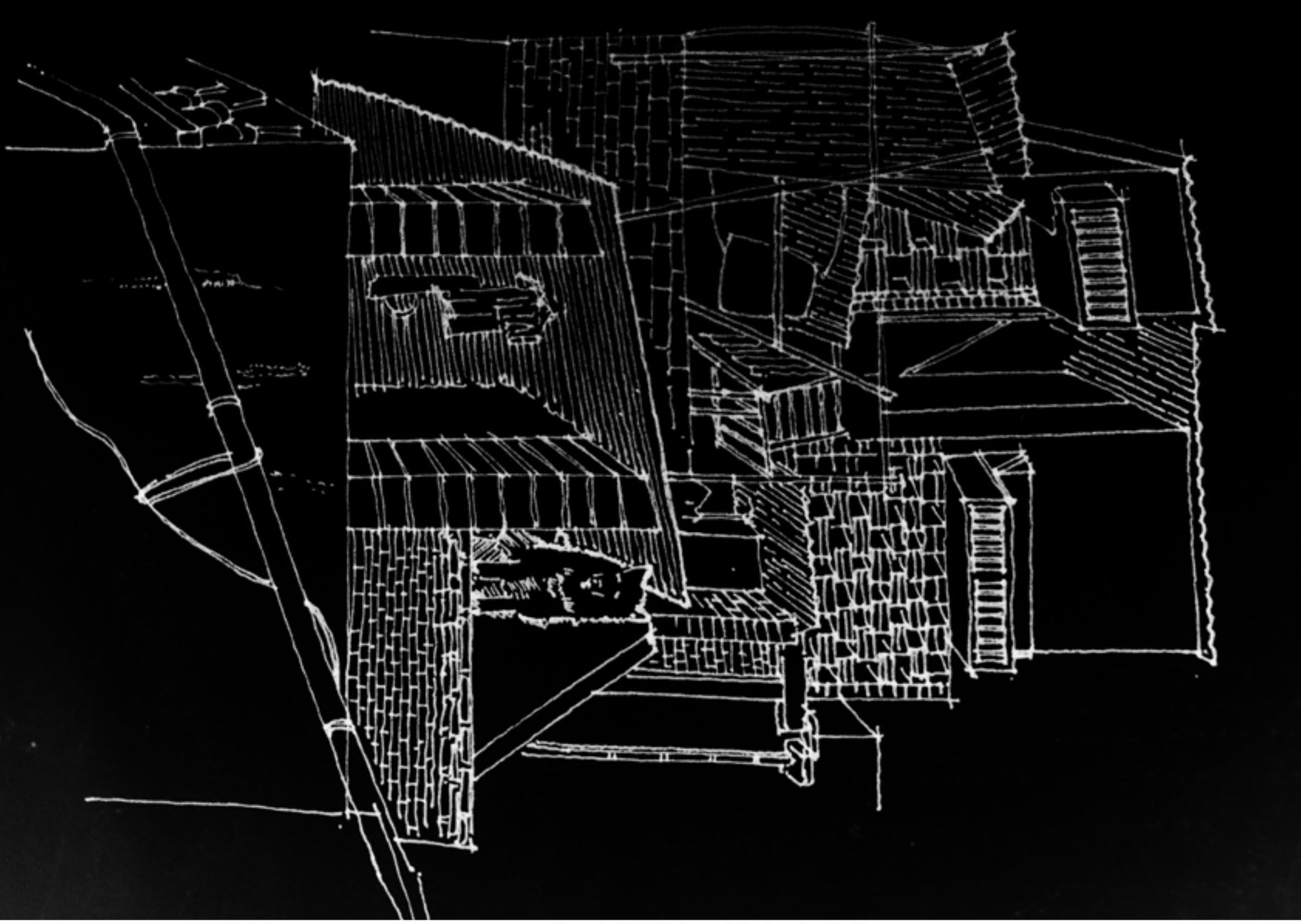
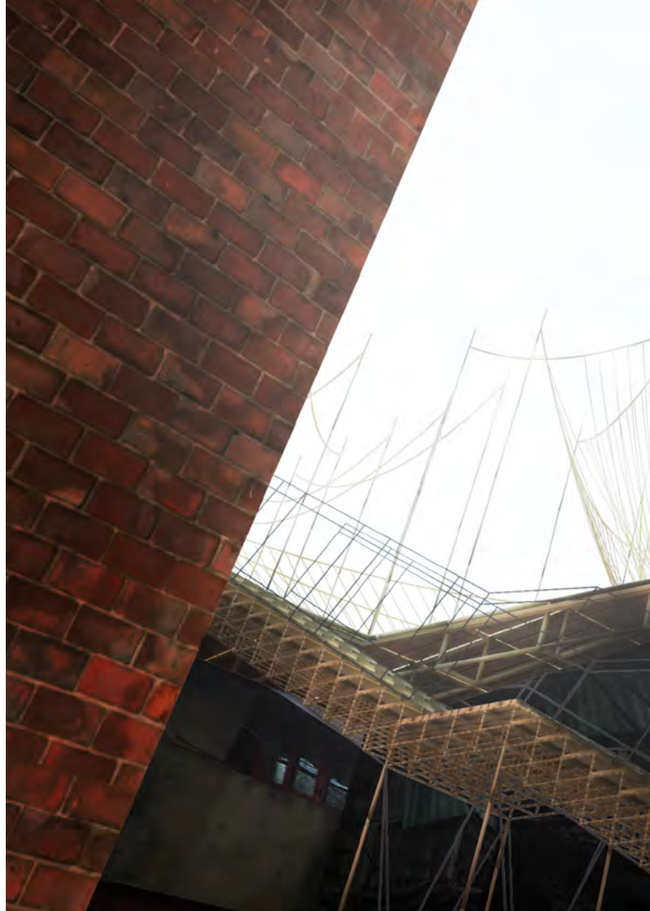


A VILLAGE IN A CITY

- transformation of an informal settlement in Shanghai

Hang Xu
Chalmers University of technology
U+A/DL, 2014 summer master thesis



Abstract

The rapid urbanisation of Shanghai has led to a lost connection to nature, seasons and trust between human beings, all of which could be found in the old villages. Even though the "Hutments", (informal settlements and former villages) are in poor conditions, these small pieces of villages spread out in the city provide qualities that are missing in the high rise neighbourhoods of contemporary Shanghai; human scale streets, intimate public space and a self-sufficient everyday life of residents. Instead of demolishing these informal settlements, as promoted by the municipality, I suggest to reintroduce the nature of the villages in the city. I also wanted to explore the possibilities of how working on an architectural scale can have an affect on the city.

In order to understand how the city works, my research takes it point of departure in the theory of urban metabolism. My main conclusion is a more self-organised system allows for higher resilience and adaptability. I have tried to understand the city in an alternative way by deconstructing it as a neural system, consisting of networks of small pieces. The cell of one neural system can be regarded as one minimum unit of the city. In order to have affect on the city, the project must either affect this minimum unit directly or plug straight into the city neural system. The hutment area is in my project understood as one cell of this neural system. The area, defined by the boundary of 3 metro stations is surrounded by gated communities and a university, hosts a lot of informal urban vending but is lacking public space.

A network of elevated roof platforms is proposed providing a new infrastructure in which pipes, rainwater collectors and other facilities can be accommodated. The platforms are at the same time working as structural stabilisation devices for the existing houses. Bamboo is used due to its quality (similar in strength to steel) and its abundance in this region of China. Pilot projects such as a teahouse, pub and community centre showcase how to build and inspire a future expansion.

"God made the country, and man made the town."

William Cowper

Content

Three main topics:

_The Hutment problem in Shanghai.
The prime purpose is to explore the possibility of designing a public building in a heavy critiqued hutment area in Shanghai as an urban intervention. The building should revitalize the unstable local community as well as provide needed function in the hutment area. It should also be an attraction point to the people outside the area, which can recall the value of the forgotten value of there hutment communities.

_Living in Shangahi (lifestyle and stressfulness)
"God made the country, and man made the town."_ William Cowper. The v attention is to express the lost respect from nature of people and the over emphasized economic and technology value in the urban context. Children lost the connection of food to the soil as adults lost the idea of connection of money and life. In such capitalize society, the consumption become

_How one architecture can affect the whole urbanism ?
The third goal for this master thesis is to test and experiment the potential of the architecture design in the urban context. Not only does the design itself derive from the context, but also it will affect the urban situation as well. No matter how well we design our city, there are always unexpected elements happening, which we call "informal city". Now, more than 50% of population in the world are living in the urban area. The whole human society can be projected completed to the city. Many different ways of mapping the city, including Tweets map, social networking, incomes and evening the Facebook location, indicate the complexity of the existing city, aka our society. The architecture project can be a trigger point that create social ripples in such a dynamic system. The architecture project can not only be catalyst in the surrounding, but also be a virus in the urban organism/ human society.

The final conclusions aims to touch upon or understand these three questions better.

fig 1.1 Lifestyle in Shanghai

fig 2.1 Barcelona

fig 2.2 Tokyo cityscape

Research problem of contemporary cities : Designed City VS Zoning City

The study start from how can we understand and tackle the problems of city from historical reference. Regardless the huge difference in size between the historical town to the megacity now, it is rather difficult to grasp the whole image of contemporary of city. One can start mapping the city from so many different aspects ranging from population density, the land value, the infrastructure, the wifi-hotspots, twitter mapping, the metro station to many un-mappable statistics, such as the GINI index, the traffic time, the Big-mac index and other many index. Old Barcelona is made perfect designed to every public space under heavy control. People invented many different methods to evaluate and mapping the city. However, when we look at Tokyo, one of the most striking modern cities now, it seems more like a self-growing organism rather than a designed object. Although we have spatial planning and urban structure department to set the basic zoning plan, the expansion and growing speed are far beyond control. One evidence is the informal activities including slums, urban vendings and self-created events, are happening everywhere in cities everyday. They can never be documented or planed in the urban planning department. One can not find any trace of slum planning in the city planning office. How we call these informal cities? Should those be eliminated? How can we make conventional research and conclusions if the complexity and the uncontrollable performance are oversized the limited of human perception? Is it still valid to use top-down strategy to create our world?

Example: Barcelona vs Tokyo (planning city vs emergence city)

(fig 2.1) The ideology of Barcelona is simply defined by evenly distributed blocks spread across the whole city. The perception of reading the city as a whole coherence object is clear. Landmarks and public nodes are distributed strategically long time before Kevin Lynch.

(fig 2.2) By abandoning the old capital, Japanese built Tokyo several times on the tabular rasa after earthquakes and the war. Influenced by the metabolism group, Tokyo is an achievement of the latest technology and concept of built environment study in 20th century. One can barely get a solid form of Tokyo.

Mapping Shanghai as a Dynamic System

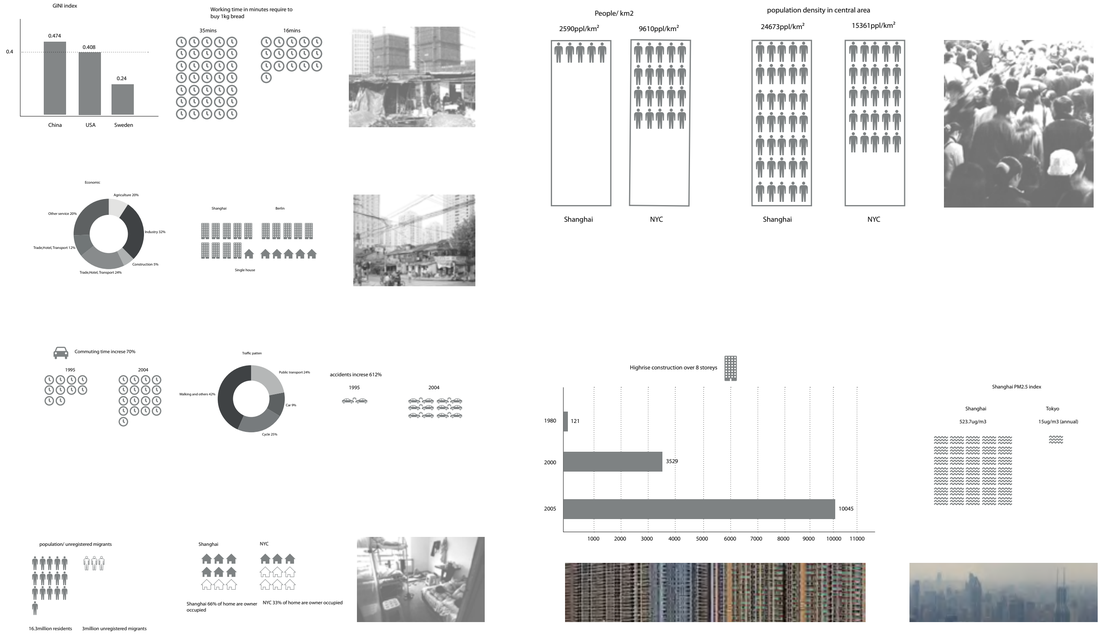
City is neither a collection of beautiful buildings, plazas and public institutions, nor a single polished piece of object. In depth, many layers, ranging from social aspects, technology aspects and physiological aspects and economic aspect, are overlapping and interacting with each other, within which one can only have a glimpse to whole city image. Every statistic or map shows a single tip of iceberg from one specific angle. The traditional way of defining the conclusion from the bigger scale to the smaller object can not be implemented due to the huge amount of data from the contemporary emergence city scape. It is impossible to identify the problems for all the different aspects of the city.

"The best way to understand city is to observe it."-Jan Gehl. The backbone of my research towards Shanghai is to combining personal perception of the city, based on my one year experience in 2012, and the traditional data/mapping. By combining the subjective ideology of the city and relative objective research mapping, I want to identify and search for the scientific support for my conclusion based upon the observation. The comparison of the subjective ideology and the statistic makes the main body of my argument and conclusions. In this way, I can start focus on one aspect of the city, namely the phenomenon of contradiction of hutments (informal residential housing) and the rest of urban development.

Shanghai, as one of the fastest growing city in the world, although under the heavily designed spatial planning, is still out of control from all different informal elements in the city, such as urban vendings, migration markets and self-created activities. In the book " The Endless City", Bruce Katz, Andy Altman and Julie Wagner write the article, "An agenda for the urban age", in which they conclude that for 21st century, those informal factors are the things determine the direction of those mega cities in the world. So instead of traditional urban mapping, I started with all different way of looking at shanghai both from the pure statistical point of view and data mapping, hoping from the chaotic understanding of different angles, I can grasp the important information from the data.

fig 3.1 Location

fig 3.2 Shanghai in statistic



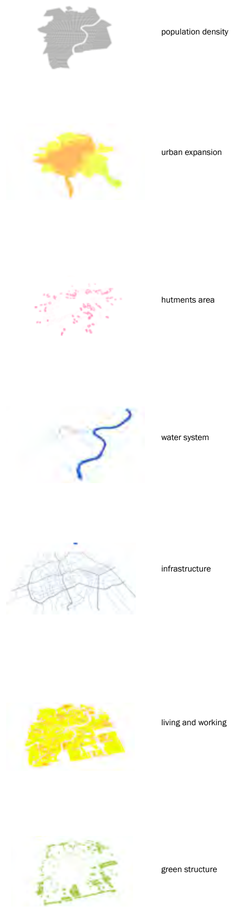


fig 3.3 city layers

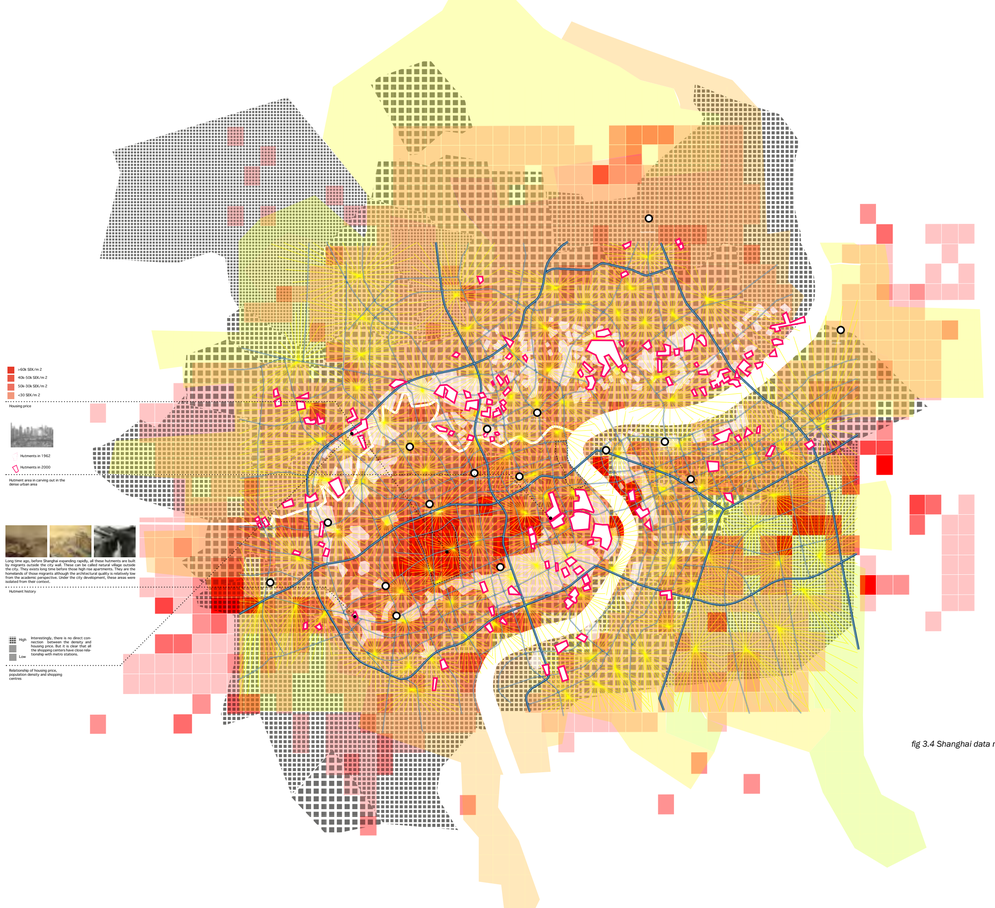


fig 3.4 Shanghai data mapping

History of hutment

Long time ago, before Shanghai expanding rapidly, all these hutments are built by migrants outside the city wall. These can be called natural village outside the city. They exists long time before those high rise apartments. They are the homelands of those migrants although the architectural quality is relatively low from the academic perspective. Under the city development, these areas were isolated from their context.

fig 3.5 hutment history

fig 3.7 hutment areas

fig 3.6 Shanghai skyline with hutments

4. Introducing the neural system theory

How to change the city ?

The city is a miniature of human society, that is also one of the most complex system to understand. The difference of modern Tokyo and traditional Barcelona indicates the quality of unpredictable in term of approach towards city design.

Butterfly effects in the dynamic system? Reverse the traditional city planning!

Architecture keeps very low power leverage point in all human history. The grand palace from the past is the outcome of social, economic and technology combination instead of architecture visionary. Although the built environment on the earth are largely designed by architect and city planner, those physical elements are just the last step of all intertwined stakeholder and factors. We, as architects, are just a hand to realize this last step.

However, even a small butterfly can have a huge impact to the climate. Today, the city can be seen as a dynamic system like the climate system. From this perspective, architects are in the best period of history, since the buildings will have the potential to affect this system. In the old Barcelona, buildings are just a compliment of urban design. But now, the architecture can be urban design itself. Or maybe the architecture is the only success way to achieve the urban value in this informal and dynamic period.

Introducing the concept of plug-in to the Urban Neural System

The whole urban system can be seen as a human body, which consists of a mini ecological system. In order to make people sick, virus should searching for a crack point in the human body. For instance, the cancer cells are not dangerous at all unless they start to grow on the neural system of the human body. The AIDS is difficult to handle not because its deadliness, but its ability to destroy the immune system of human beings, in which way other virus can affect human body more easily.

In order to influence the city by a small project, one has to find the neural system of the city. By plug in to the city neural system, Certain butterfly effect can be achieved in such dynamic system. The city neural system can be physical, for example the infrastructure, the water and the metro, or virtual, for example the facebook networking, the social networking, the tweeter connection or the media coverage. One of the most famous project is the Guggenheim museum in Bilbao. In spite of its unique architecture design, the hype this project reached very high level from different media networking ranging from fashion magazine, architecture books, tourism recommendation books, movies and TV show. By using those virtual neural system, Bilbao even overcome its geological weakness, and become a landmark city in the world.

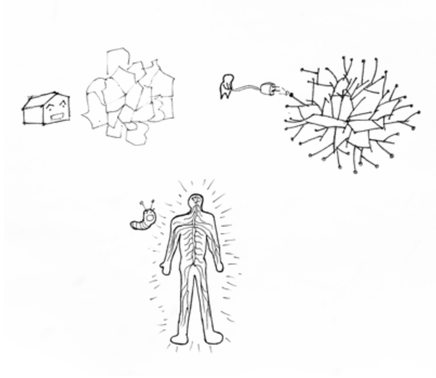


fig 4.1 Analog from the blog-neural system shows how virus can affect the human body by invading the immunes system.

NO.1 The metro neural system

Same as all metropolis in the world, Shanghai is a city heavily depending on its public metro system. Not only are the physical boundaries changes, also the image towards Shanghai for people changed dramatically. Everyone can draw the shape of the city in middle age. But now one even can not recognize the other district in the city. Helped by metro system, people do not need to know how far the destination is and where it is located. The only two things to remember is the name of metro station and how much time one need to reach there. The whole city is deconstructed by the metro neural system, that is also the most important neural system in city. That is the reason why all big shopping malls, regarded as the church in our capitalized world now, are located around metro station. So I make the vironi shapes of the metro station indicating the clastic characteristic of Shanghai. The city can be read as a vertical tower using metro as the elevator. My project must working with this neural system to maximize the influence towards the city.

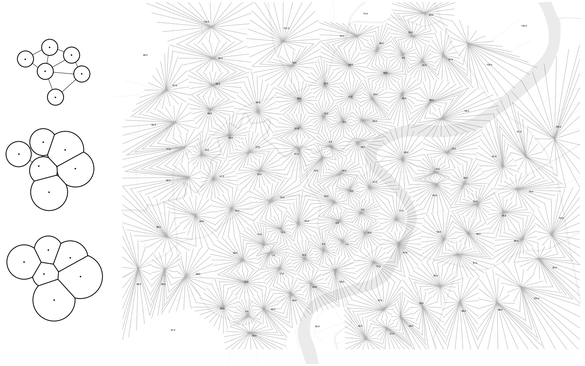


fig 4.2 the neural system of the metro stations

fig 4.3 The city is deconstructed into a vertical tower by the metro neural system

NO.2 Water neural system by Suzhou River

Suzhou river used to be a heavily polluted river because of its industrial importance to the inland of China. But it is also a very important tourism river that connects most of the cultural heritages in shanghai. Started from 20 years ago, the municipality began to clean up the river and created natural parks along the river. Many innovative artistic studios were founded along the river as well, using the old industrial buildings. Nowadays, it is very attractive walking or biking routes for the citizens. The outside tourists also take it into the Consideration to sightseeing shanghai city by boat.

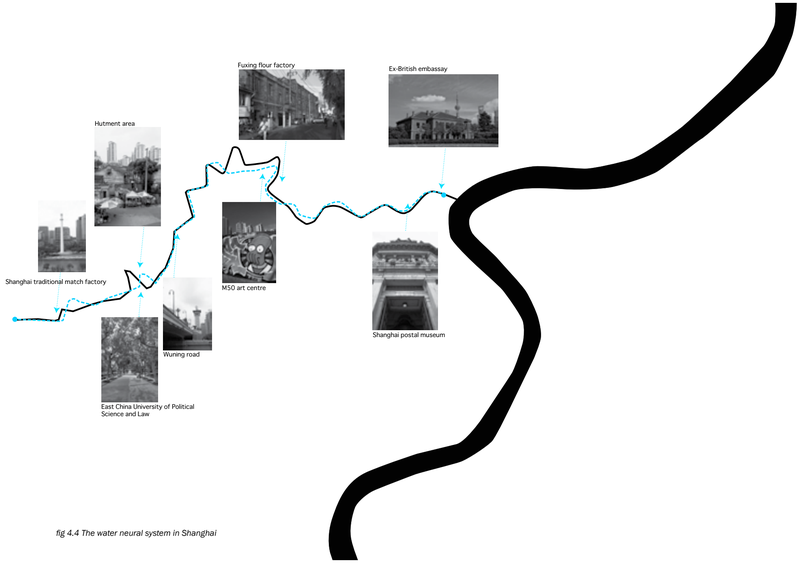


fig 4.4 The water neural system in Shanghai

Combined neural system

Background

Cao Jia Village

The selected area is called Cao Jia Cun, which is one of the most infamous hutment area in Shanghai, where a movie about 72 families living in a very small hutment community was filmed here in 1950s.

Nowadays, the huge contrast remains between the expensive housing commuity and those hutment areas.

Gated community arround

Gated community

Surrounded the hutment area are many gated communities, which are the most common way of living in China nowadays.

Pedestrain road vs public space

pedestrian public space

There are very thin pedestrians routes surrounded the gated communities, providing very limited public space in-between.

Urban vending

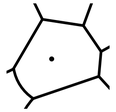
The informal urban vending, which is heavily criticized by the government, is extremely popular in the area due to flexibility and low cost.

Short cut to water front

To the west of the hutment is a university, which can always become a welcome public space for people living around. However not many of them knows the short cut through the hutment area. Most of them choose to go around the hutments to the water front.

-Metro station
-Researching boundry
-Pulgin to neural system

The neural system described in the previous research indicates the research boundary and the affected region. So the land between 3 main metro stations becomes the research target.



Height difference

The height difference of the high rise apartment and the low hutment is huge. Those high rise creates a feeling of juxtaposition to the people inside the hutments. On the other hand, the hutment area provide an intimitive spatial quality that is absence in those gated communities.

fig 5.1 The conclusion was made inside the research boundary defined by the neural system theory including the metro system and the water system

The wall during EXPO / informal vending

During the EXPO in Shanghai, a long wall was built in order to cover the chaotic hutment area behind. This ironic wall became a new Berlin wall under half dictatorship municipality. After several years, people started to break this wall, opening many different commercial department simultaneously regardless the illegal actions. This action clearly shows the energetic activities here .

Flooding/Sanitation

There are heavy flooding and sanitation problem in the area. Every summer, because of insufficient of the drainage infrastructure underground, the flooding happens.

The sanitation problem is mainly caused by throw compost trash everywhere. The people living here are quite sustainable because all the recyclable trash is collected and sold to the nearby recycle company.

Sunlight/Structure weakness

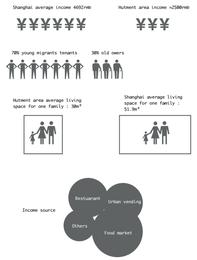
The direct sunlight is blocked by both the hanging cloth above the street and the slim buildings. This makes the whole public space more unwelcome to the outsiders.

There are many stack buildings on top of each other. The structure weakness is one of biggest factors that one has to deal with.

Functions

The surrounding functions are very diverse. But most of them are the gated communities. Noticeably, along the street are mainly informal commercial that break the wall, together with many informal urban vendings. On the side of the river is a university for both students and public.

Statistic



The Pilot project

The idea is to choose the street that directly connected from the street to entrance of the university at the water front, since it has most opportunities to transform. And the design solution of those prototypes can be applied to the other part of the hutments area, even to other hutment areas in Shanghai.

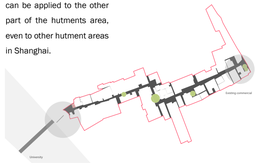
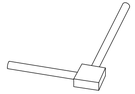
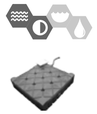


fig 5.2 The conclusion was made inside the hutment area

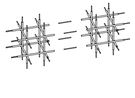
fig 6.1 catalogs





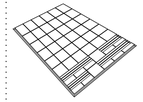
RAINWATER SOLUTION

The rainwater collecting device can create water source for the urban farming. Meanwhile the flood problem can be solved. More importantly, it can be sponsored and promoted by the municipality due the pollution challenge in Shanghai.



CONSTRUCTION

The idea of modular system using small pieces of bamboo is made due to the economic and environmental friendly factor.



PLATFORM

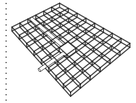
By moving many element to the platform, the generic solution is created to open the village street to the public in order to make a better public image.

HYDROPONIC FARMING

It provides a light weight way of makeing urban farming on the roof the partment. A new life pattern can be generated and admired by the public.

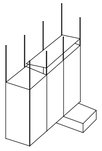
ECONOMIC VALUE

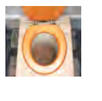
Informal urban vending is regarded as a opportunity factor in the area to generate economic value and improve the public image.



INFRASTRUCTURE

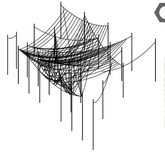
It provides new possibility to customize the platform, meanwhile acting as a stabilizer the buildings underneath.





COMPOSTS

This solution aims on creating better sanitation situation in the area. The compost can be recycled for urban farming, in which way it can be a economic generator.



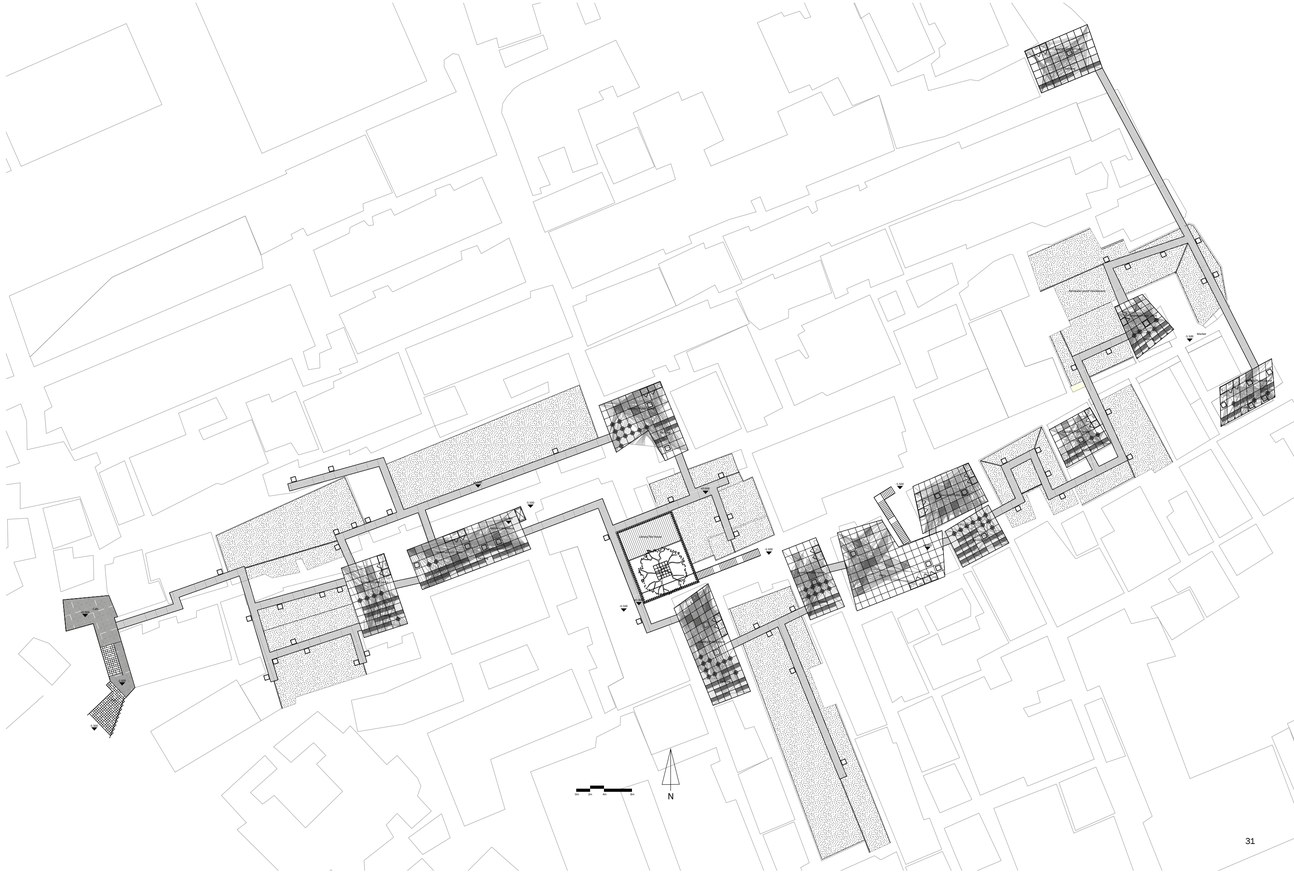
LAUNDRY ROPE

Being a main element for laundry, the new way of thinking and creating space is explored by using those ropes. It also become a new landmark over the existing structure.

MATERIAL_BAMBOO

As one of the most adopt material in the South of China, the resource of bamboo is almost infinite in Shanghai. It has good strength as steel. The only problem is to deal with the deflection by filling concrete inside.

fig 6.2 the plan



Systematic Thinking Approach

The urban strategy is under the systematic approach thinking. All the elements are designed to both solve certain problems and support with each other. Feedback loop can be created within these elements. This system connects to the bigger system in the city, for expamle the lifestyle in the busy city and the hutment daily life.

Architecture for people, not for the physical shells

Architecture as a profession with very limited power on the leverage point, what can architects do with the activities afterwards. Many temporary buildings are admired and be kept forever. On the other hand, peoples demolished so many monuments. The essence of the project is not to keep these small buildings, regraded as not much architecture value, as someone's home now, but to support those grassroots people living inside those buildings. In the Dynamic system, the small butterfly can cause a huge impact to the whole system. The architecture design is not only about only making dazzling space for those privilege people, but also about become a useful device for all different people.

What will make the public space really public? Instead of choosing some conventional solutions including transforming it into the shopping street or introducing artists to occupy the plots. The most important thing of architecture is to allow original users to keep using it happily. The bottom line is designing architecture is not only about physical material, technology and the space, but about a place for a group of lives, a part of memory or a piece of music.

Q&A:

-How will poor people do the garbage sorting?

Garbage sorting is very irritating even for many well educated people. The existing problem is people lost the connection to destination of the waste. In the nature ecosystem, there is not term about waste. Once the people know the waste become the economic source for the urban farming, they will do the garbage sorting more spontaneously.

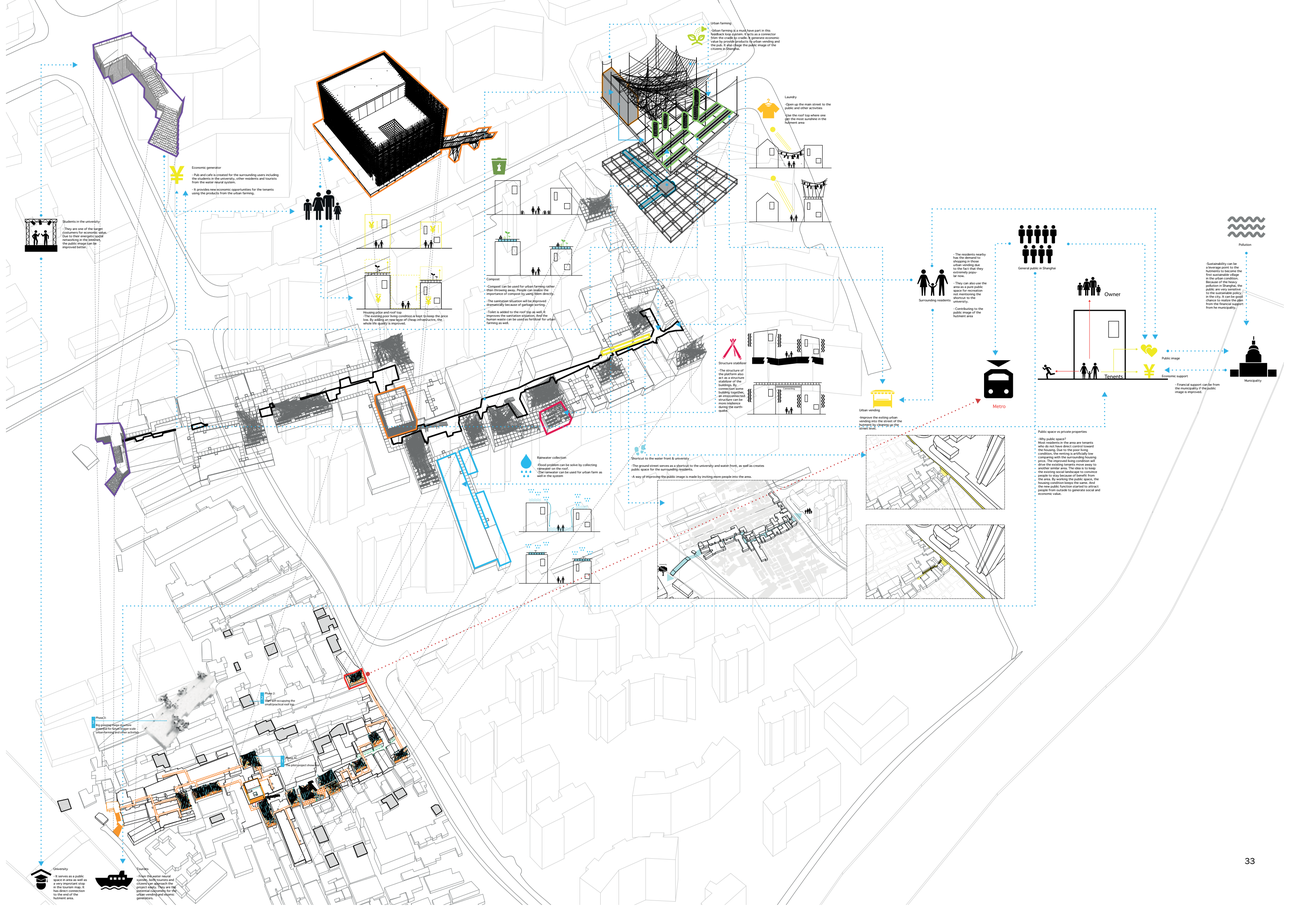


fig 6.3 the systematic map of the urban strategy

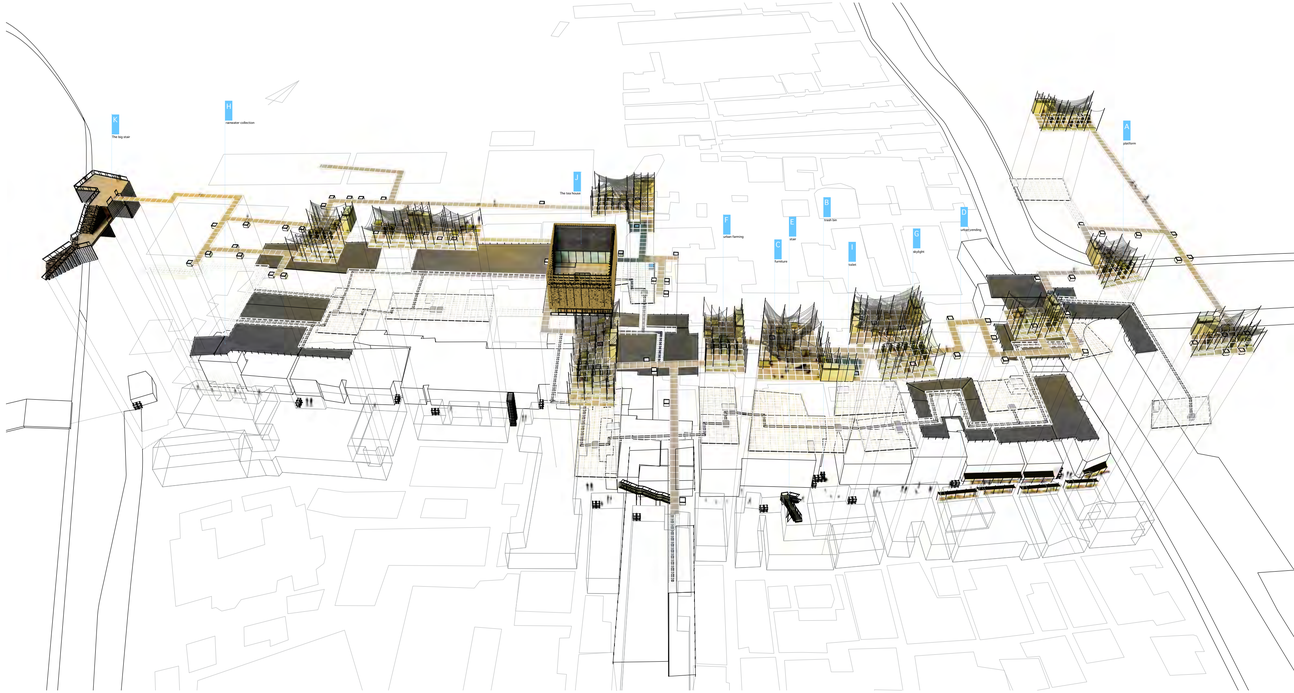
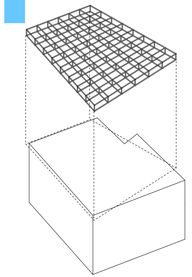
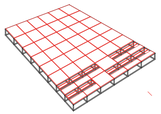


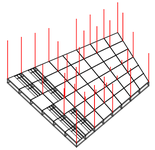
fig 7.1 the architecture solution

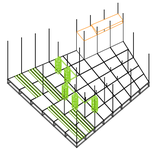
A

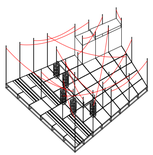
Platform

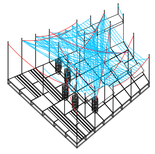












Platform

-Infrastructure

The new platform creates a new layer of infrastructure on the top of the existing context , avoiding the heavy and impractical digging work underground. The bamboo made spatial truss system open up big opportunity both for different pipes and more ambitious activities happening on the platform in the future.

-Bamboo+ropes

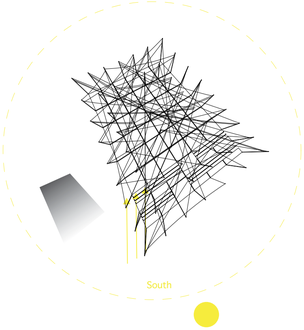
Bamboo and ropes are chosen from many early experiments due to their abundant in the Shanghai region. Bamboo has been a practical scaffold material in China long time ago. The rope can not only be a functional elements for laundry, but also be a spatial creator.

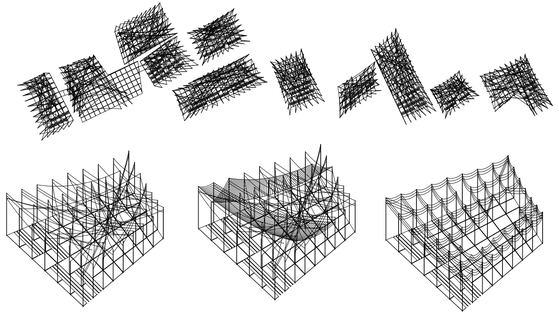
-Spatial quality with rope and sticks

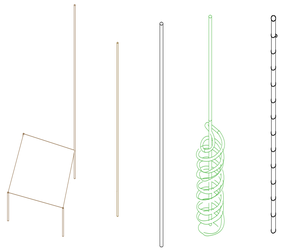
By playing with ropes and sticks, which can be transformed from regular bamboo sticks to hydroponic pipes, a kind of unique and undefined space is formed.

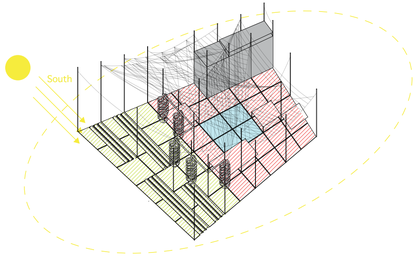
-Parameters

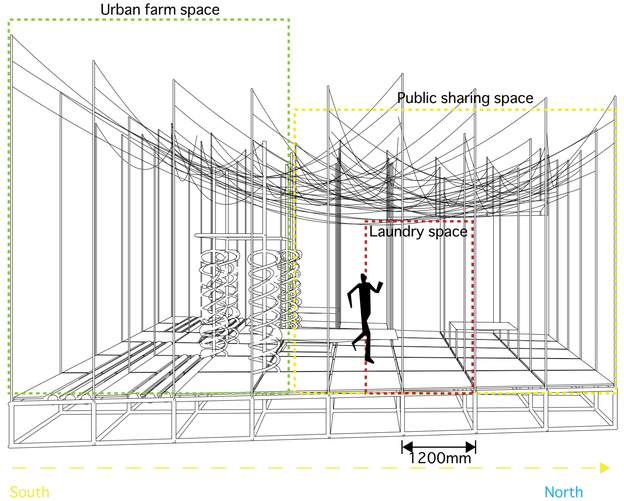
Although all the architectural elements are customizable, certain parameters are controlled including the urban farming need for sunshine (the height of the sticks), the density of the rope and the curvature of the ropes. The undefined interesting space is formed by those parameters.



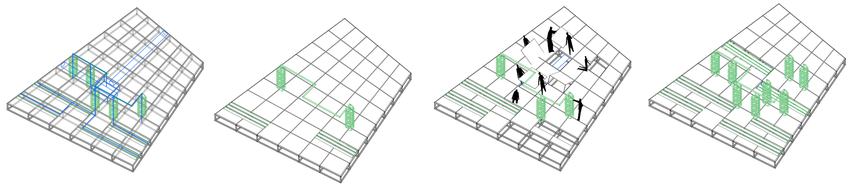




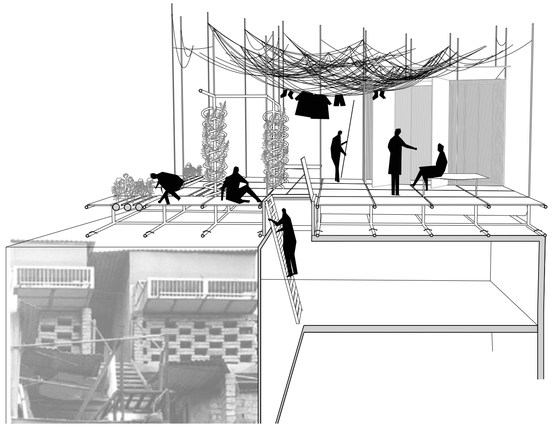




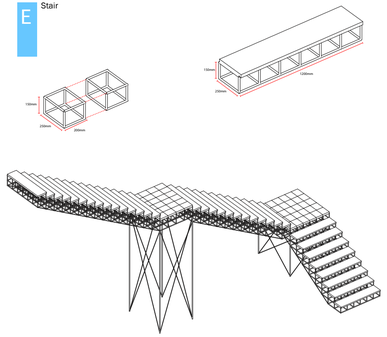
F Hydroponic farming



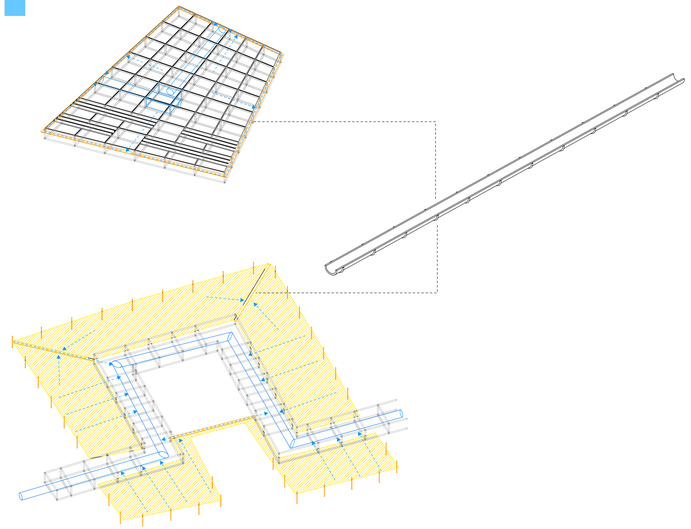
G Skylight



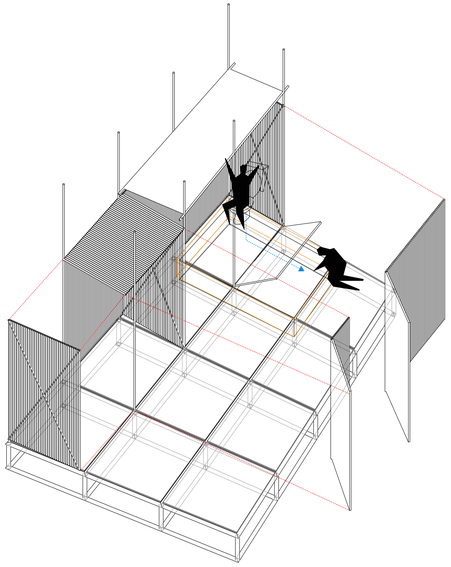
E Stair



H Rainwater



I Toilet

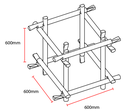


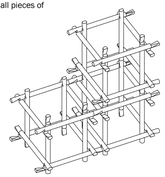
B

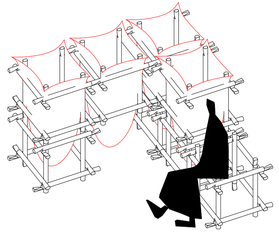
Trash bin

-Small material elements

The same design philosophy is implemented everywhere in the project. The customizable quality and economic feasibility (with small pieces of bamboo) can be achieved in the trash bin design as well.

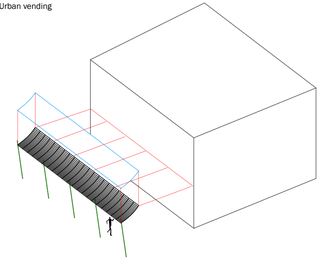






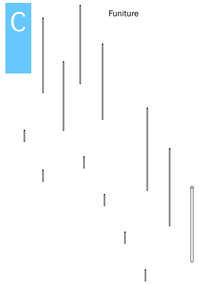
D

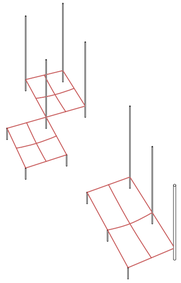
Urban vending

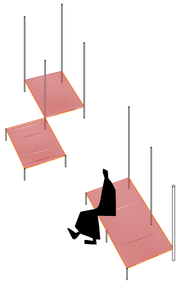


C

Funiture







-Repeat the same design elements about bamboo sticks
By changing the height of the bamboo sticks, combing with the rope, different urban furniture can be designed and made in the community. Although it is not a mandatory solution. It provide the new scope towards these 2 kinds of cheap material.

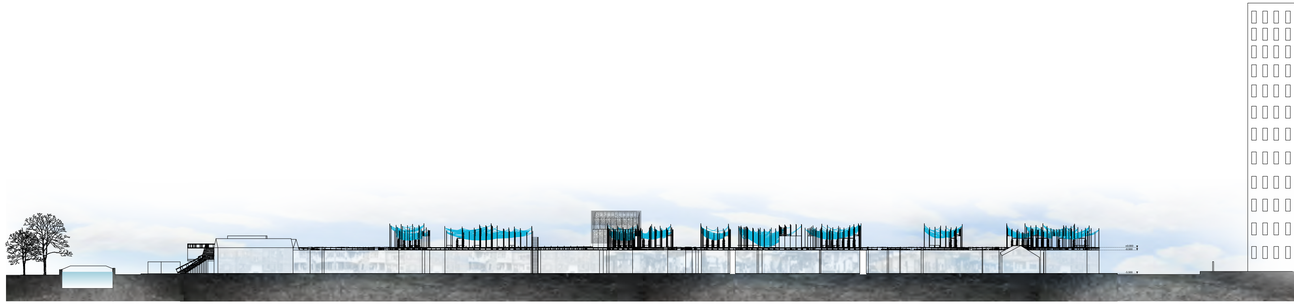
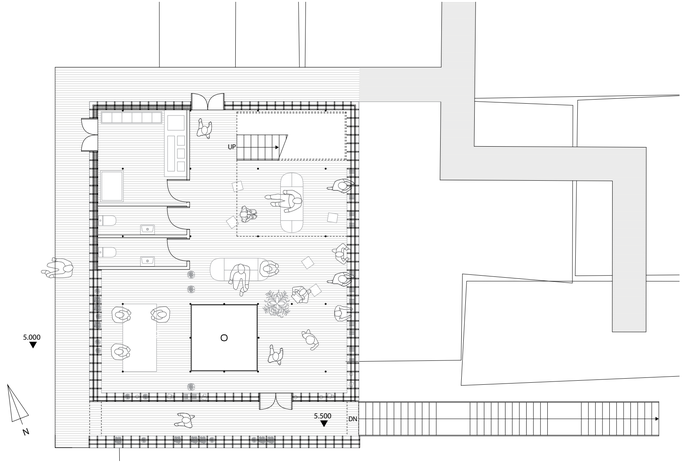


fig 7.2 elevation of the 'clouds' atmosphere over the existing building

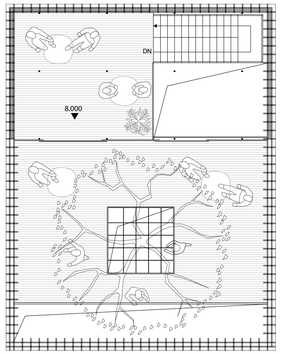
fig 7.3 Different space is formed simply by farming structure, strings for laundry and simple furniture

fig 7.4 New program can be made by changing the configuration of the strings, for example the playground for children

fig 7.5 exterior rendering for the tea house/ community centre



Level 0 plan



Level 1 plan

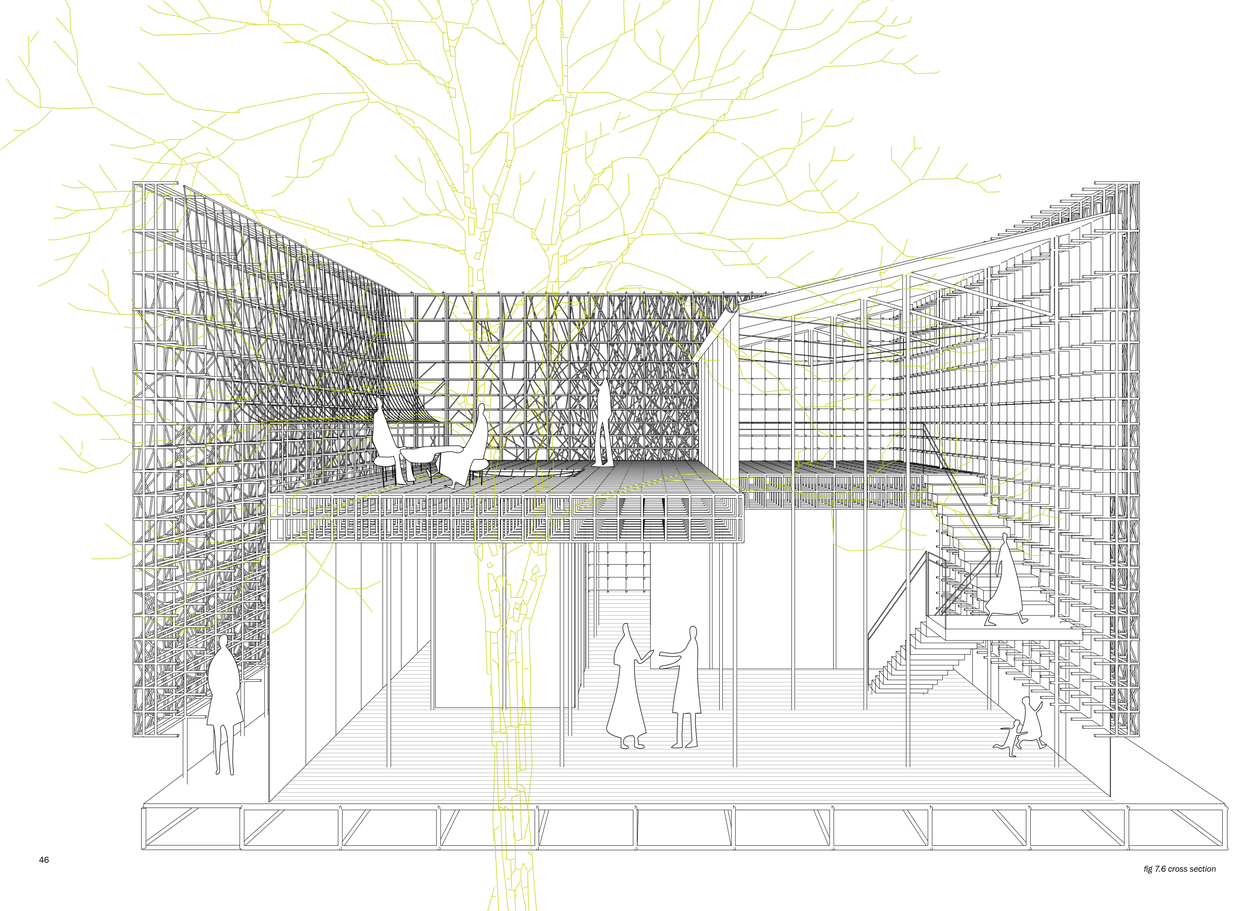
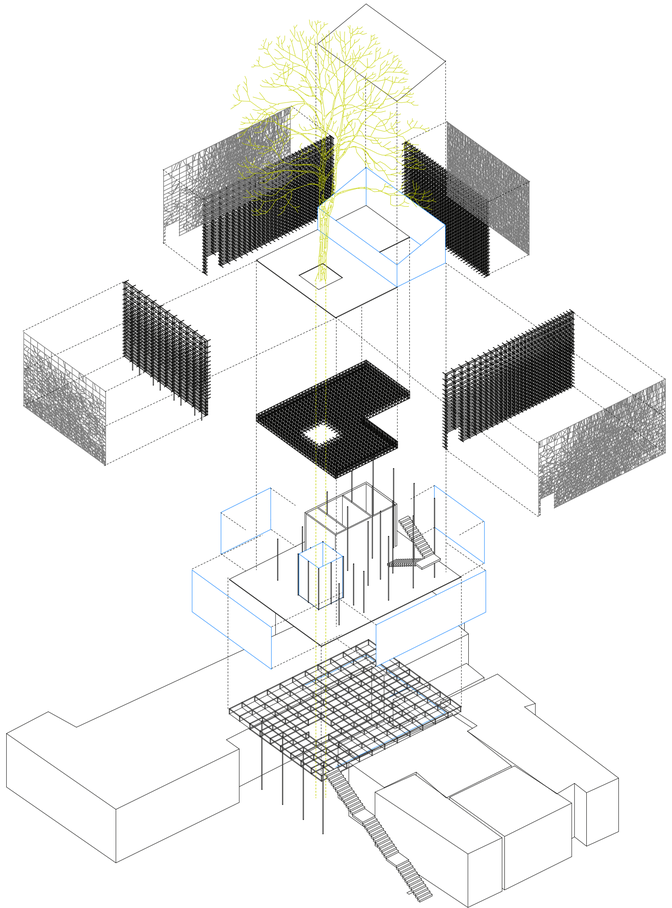


fig 7.6 cross section

fig 7.7 explostion isometric view showing the 4 elements of the building, namely the foundation, the frame, the enclosure and the support



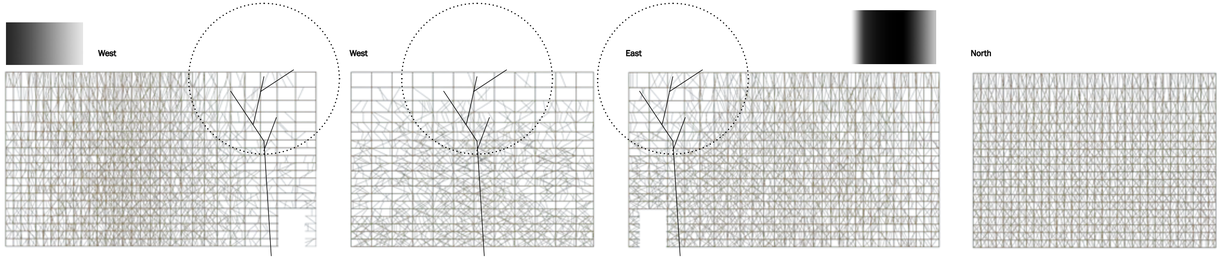


fig 7.8 sun shading device made by ropes controlled by solar radiation parameters

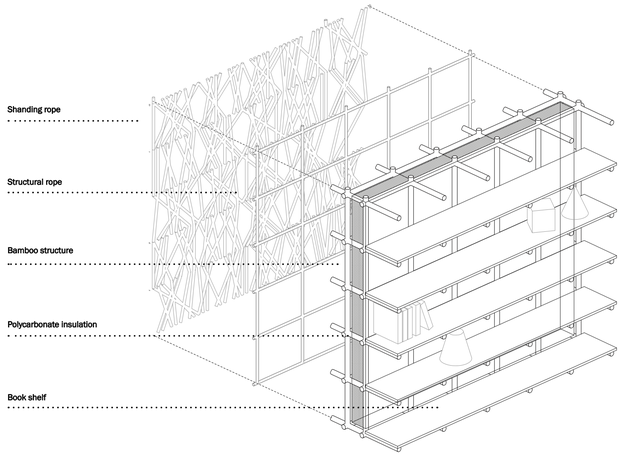


fig 7.9 isometric drawing of the enclosure concept

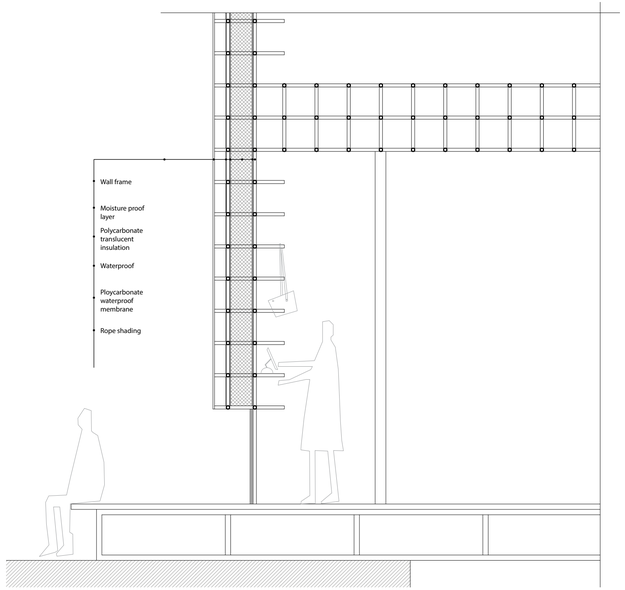
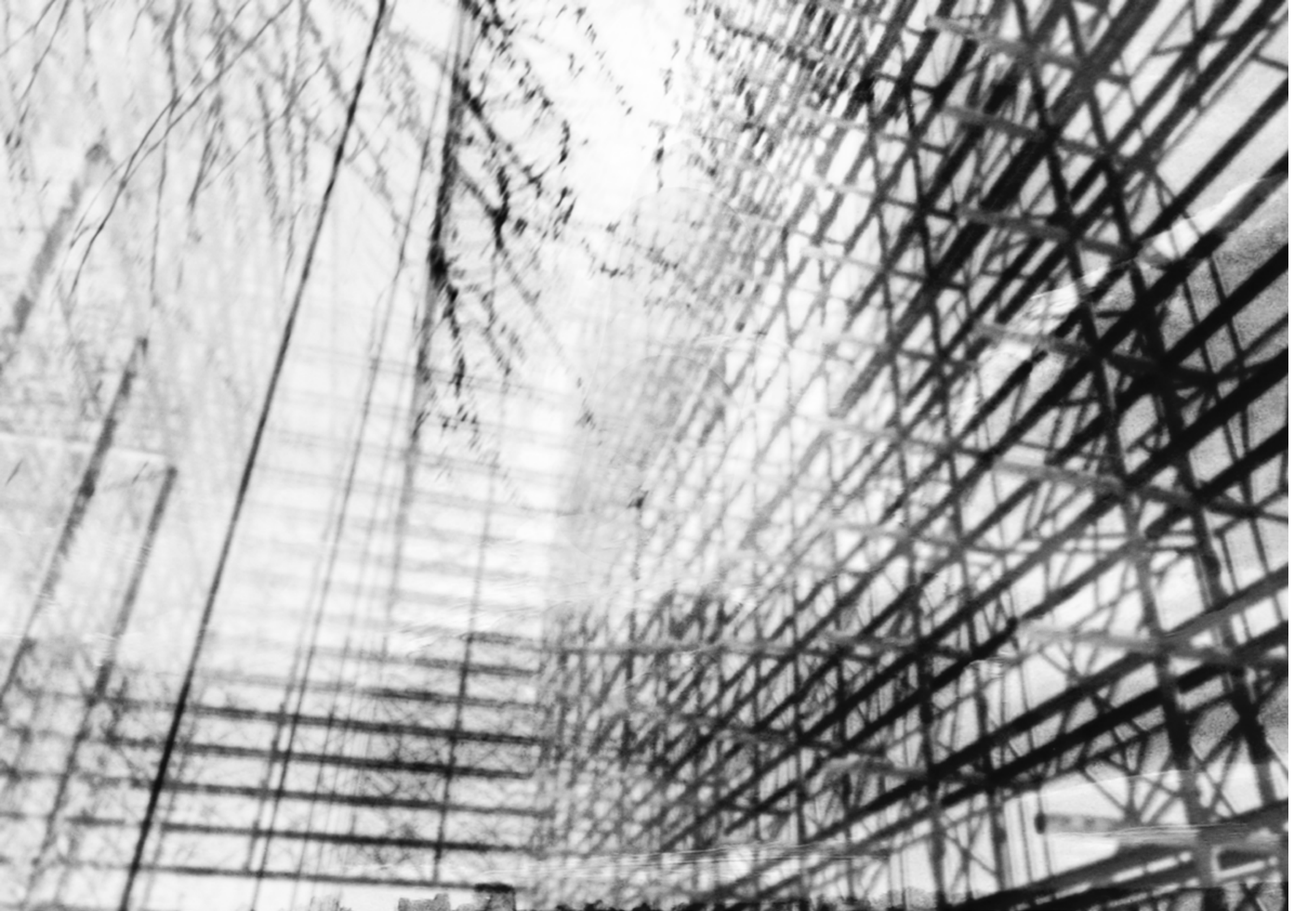


fig 7.10 section of the enclosure

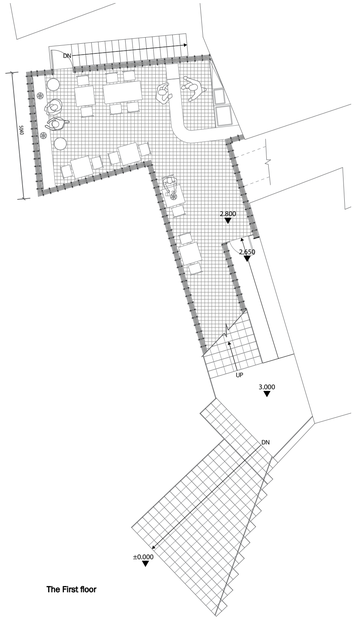


A TEA HOUSE

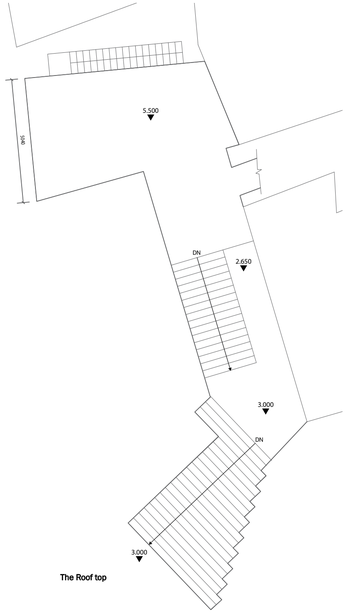
A tea house, a knowledge hub and a refuge from the urban chaotic must be a place for the peaceful soul. To get rid of the competition stress from the external world, one can talk to yourself under the shelter of a tree, behind a bamboo filter that stops the noise from outside. Except the facilities, thin bamboo columns define the space usage. People read, relax, talk and sleep in this soul place hanging over the village.

fig 7.11 exterior rending of the public stair

The Ground floor



The First floor



The Roof top

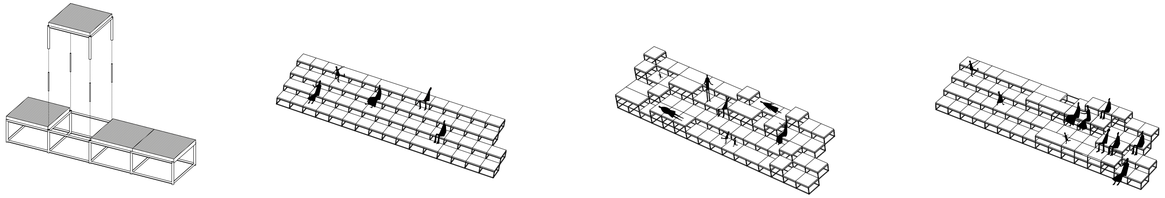
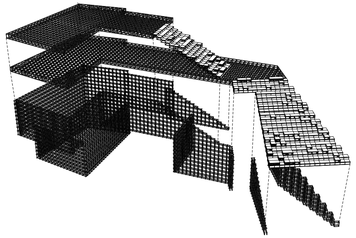
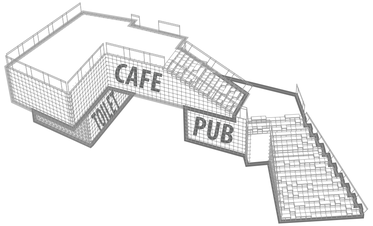


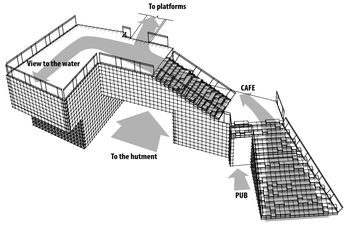
fig 7.12 open stair configuration depending on activities



isometric explosion



program



circulation

A PUBLIC STAIR

-Undefined public space

The biggest idea is created a connection space not only for connecting. Many different and unanticipated activities are encouraged on this big stair. Chairs are changeable depending different activities. A fluent transition from the ground to the platform at 5.5 m should be created.

-Bamboo wall & Polycarbonate insulation

The bamboo walls are made with small modular bamboo components to bear the weight of the building. The insulation is exposed and sandwiched in between the bamboo components. The semi-transparent polycarbonate panel creates closure feeling inside for the pub. The exterior space is quite open and direct.

-Platform to the water

On top of the building is the view port towards the water and the university. It serves as the end point to the ground street of the hutment.

-Skylights under the stair

Under the stair, the only parts by glass create a dynamic light condition within different people passing by.

Hang Xu
Chalmers University of technology
U+A/DL, 2014 summer master thesis