TECHNISCHE UNIVERSITÄT WIEN
Vienna | Austria

Diplomarbeit

The Zen Axis

ausgeführt zum Zwecke der Erlangung des akademischen Grades
eines Diplom-Ingenieurs
unter der Leitung

Helmut Schramm ao.Univ.Prof.Dipl.Ing.Dr.techn.
Abteilung für Wohnbau und Entwerfen, 253.2
Institut für Architektur und Entwerfen, TU Wien

eingereicht an der Technischen Universität Wien
Fakultät für Architektur und Raumplanung
von

Emil Dworschak
1128111

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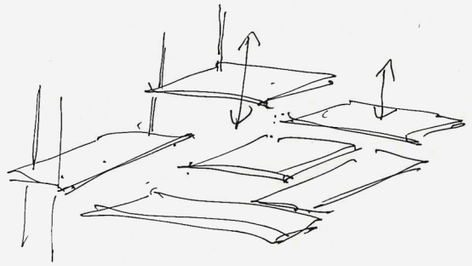
On the first of September 2017 I went to Tokyo after being awarded a Joint Study Scholarship to conduct research for my thesis with the working title “The ‘Raumplan’ in contemporary Japanese architecture”. The idea started out rather vague by trying to experience space as it is dealt with in a contemporary but also in a traditional sense in Japan; and to compare my discoveries with Adolf Loos’ “Raumplan”.

Very soon this vague ideas turned into a specific project. Aside from working at the University I applied to the offices “Shigeru Ban Architects” and “Sou Fujimoto Architects” to do an internship and started working there for 3 and 2 months respectively. Especially Sou Fujimotos well known “House NA” was a big influence on me and an important first point of reference for conducting my research.



The property prices in Tokyo rank amongst the highest in the world and are still rising. There seems to be no change in this trend, and especially in Japan architects have adapted to this problem. The conclusion is the design of flats that are reduced in size lacking of proper space and respective functions, creating enclosures that cannot meet all the desired uses anymore. Moreover, since the emergence of modernism the Japanese people drastically changed their lifestyle. Hosting guests, which used to be one of the most important aspects of a traditional farm house, has now become an abnormality, because most flats are simply not big enough anymore and do not feature a big enough room.

However, the Zen Axis project on the other hand does not abandon any functions but it significantly increases its performance to accommodate all possible ways to use it. The prototype, the “Unit”, just takes about 20 square meters, but the possibility to partially transform and adapt the floor and the ceiling, to meet the constantly changing desires of its users, makes it seem like a huge apartment. The inhabitant explores space in a 3-dimensional way in terms of movement. In a typical room layout the individual can just explore the space in 2 dimensions, leaving aside the Z-coordinate. With the platforms taking over the task of furniture as well it allows for a modest lifestyle without being dependent on material possessions.

Thus, The Zen Axis

①

②

Shogun Tokugawa Ieyasu

Shoguns were the military generals who ruled Japan from 1192 to 1867. They were supreme commanders with more power than the emperor himself. Tokugawa Ieyasu ② was the founder and first shogun of the Tokugawa Shogunate of Japan, which was in control of Japan until the late 19th century. With the newly constructed Edo castle the city's status rose significantly and the years of this Shogunate became later known as the Edo period.

External sources:

1: http://www.metro.tokyo.jp/ENGLISH/ABOUT/HISTORY/history01.htm (22.09.2018)

2: Gilbert Rozman, Urban Networks in Ch'ing China and Tokugawa Japan, 1973

3: http://www.metro.tokyo.jp/ENGLISH/ABOUT/HISTORY/history01.htm (22.09.2018)

Images:

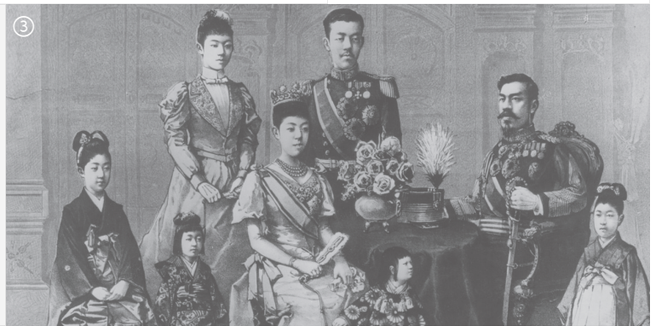
① Edo, the fishing village (https://www.scmp.com/magazines/style/travel-food/article/2134284/amazing-images-tokyo-it-became-city)

② Painting of Shogun Tokugawa Ieyasu (https://commons.wikimedia.org/wiki/File:Tokugawa_Ieyasu2_full.JPG)

③ The Meiji Emperor and his family, circa 1880. Hulton Archive / Getty Images

The Meiji Restoration

This event means the reinstitution of the royal emperor as the actual ruler of the whole of Japan and the abolishment of the Shogunate. Connected with this was not only the construction of a new political system based on Western models, but also a complete transformation of Japanese society. ③ shows the adults of the royal family wearing western style clothing.



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Tokyo, an introduction

東京

to (eastern) kyo (capital)

Tokyo was not always a reputable centre of politics and culture in Japan. Instead there was just a small fishing village by the name of Edo. The first mentionable step took place in 1603, when the town became the seat of the military ruler Tokugawa, a Shogun.[1] This newly instated military presence attracted many new residents over the following years and by the eighteenth century Edo's population already exceeded a million, making it one of the largest cities in the world back then.[2] The emperor of Japan however was still residing in Kyoto at that time making it the formal capital. The actual power though lied with the shoguns and their military.

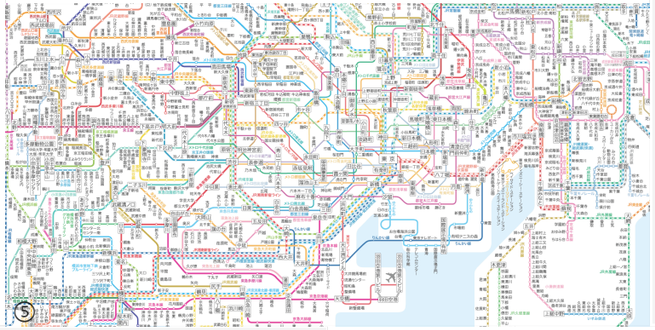
Only in 1868, during the Meiji Restoration the capital was moved to the east and Edo was renamed Tokyo.[3] A shift of power which came about following a political revolution against the Shogunate and, at least nominally, returned control of the country to the imperial ruler Meiji. The new political power paved the way for fundamental reforms that enabled Japan's fastest possible modernization after an extended phase of isolation. An isolation caused by Japan politics to protect itself against seemingly dangerous influences resulting from imminent European trade conflicts and the emergence of Christianity inside the country. In the end pressure from the western powers prevailed and the country had to open to the world. To this day this isolationist policy remains very palpable despite the influences coming from the West in the course of the following century.

④

Tokyo

"At first glance, the world's largest city resembles a formless, oversized suburb. Closer examination, however, reveals concentrated patterns and order to the chaos. For all its modernity, Tokyo is a city steeped in the past. In its backstreets and in the crevices between its postmodernist architecture and elevated expressways lie hundreds of temples, shrines, stone steles, Buddha images and statues."

– Author unknown (https://www.insightguides.com/destinations/asia-pacific/japan/tokyo/profile – 12.09.2018)



⑤

Greater Tokyo Public Transport System

"Public transport within Greater Tokyo is dominated by the world's most extensive urban rail network (as of May 2014, the article Tokyo rail list lists 158 lines, 48 operators, 4,714.5 km of operational track and 2,210 stations."

– Wikipedia (https://en.wikipedia.org/wiki/Transport_in_Greater_Tokyo)

External Sources:

4: http://worldpopulationreview.com/world-cities/tokyo-population/ (12.09.2018)

Images:

④ View from the Top of Mori Tower in Roppongi, self-made photo, 2017

⑤ Tokyo Metropolitan Metro Map (https://www.reddit.com/r/WTF/comments/1ng9py/a_simple_map_of_the_tokyo_metro/)

The Japanese struggled to locate their country in a world that had suddenly and dramatically expanded. The Meiji Restoration was regarded as the starting point for Japan's success. The aim was to close the gap to the Western supremacy; to get rid of unequal treaties which were established due to their inferiority. These treaties granted the Europeans and Americans one-sided economical and legal advantages. While other Asian countries found it difficult to regain independence from the West, Japan adapted rapidly and its economy and military were growing. Drastic reforms were carried out in practically all areas mimicking western models. Scholars and scientists were sent abroad to learn from the west, while foreign experts were invited to teach in Japan; an approximation which left its marks.

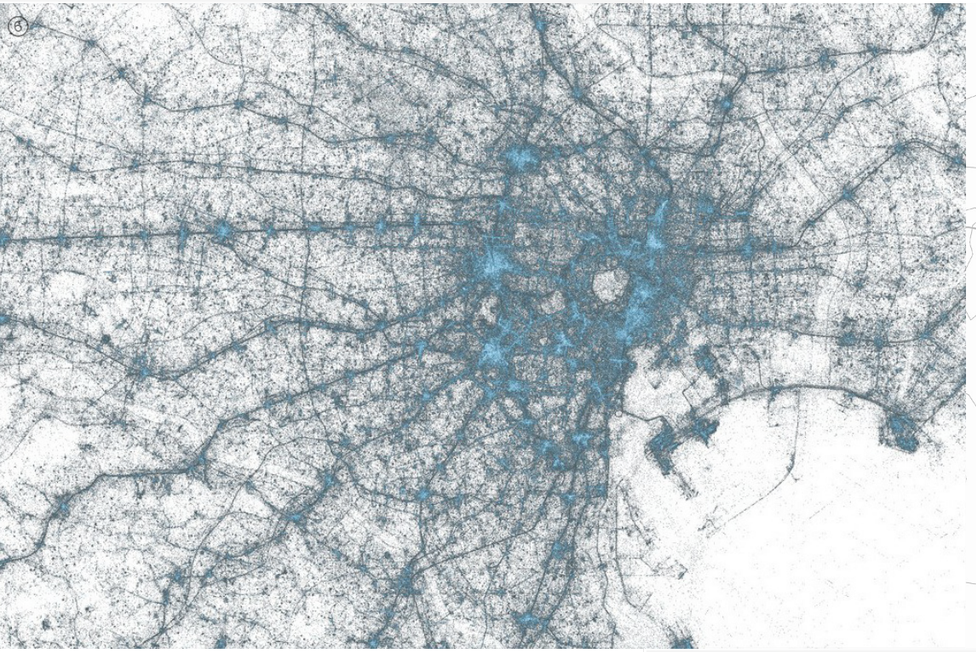
Especially notable was the transition in the bigger cities. Soon the first modern buildings were popping up in Tokyo. Men started wearing suits instead of their common kimonos. The centralised national government invested heavily in infrastructure and the production sector. Tokyo as the new prospering capital is on the best way to consolidate itself as a major cosmopolitan city.

Today Tokyo is a metropolis of inconceivable extent. Depending on how one tries to put numbers on it, Tokyo ranges from 10 Million up to 36 Million inhabitants[4], which would provide the city with the title of the biggest municipality in the world. Of course the absence of data from China does help here. But this is just statistics. On the ground Tokyo reveals a completely different face. To friends and acquaintances I often used the term "an accumulation of towns and villages" to describe the felt circumstances, the nature of Tokyo.

It is true that someone might feel overwhelmed when situated inside Tokyo's formidably huge metro stations or in the midst of crowds at the famous Shibuya Crossing or inside the vibrant Kabukicho. But aside from that it is easy to find spaces close by which resemble small villages, where people walk on the narrow streets and neighbours talk to each other in front of their tiny houses. Small alleyways are lined with traditional wooden houses owned by single families putting plants pots and furniture onto the street. And these cosy places are often located in between those bigger focal points, not on the periphery.

Tweet Map Tokyo

“Tweet Maps” show all the geotagged posts sent out by its users on the website “Twitter” over the course of a certain span of time. The depicted graphic shows data collected by Miguel Rios from 2009 to 2013. Light blue shows the highest density of posts, followed by dark blue. White areas do not feature enough data traffic to be taken into consideration. This tool gives a clear picture of a city nowadays and shows where people really spend their time.



Images:
⑥ Tweet Map Tokyo, 2013 (Twitter - Miguel Rios #billionstrokes)
⑦ Yamanote Line (https://commons.wikimedia.org/wiki/File:JR_Yamanote_Line_linemap.svg) 12.09.2018

The Yamanote Line

The Yamanote Line is Tokyo’s most important metro line. It is a circular line which connects Tokyo’s major city centres. The price of land depends greatly on the Yamanote Line as it demarcates inner Tokyo. Property inside this boundary is more expensive.

As Tokyo does not have a centre in the way a European capital does, it is difficult to comprehend at first. The many metro and train stops define hundreds of small centres each of them with different emphasises. When some of the numerous train and metro lines, which go through Tokyo, meet up a more important site is formed around the station. When there is a stop with only one line relating, or no stop close by, a small village like structure might appear.

The locations of those centres as I will continue to call them often seem very random and I would need to speak verbosely about it. To sum up infrastructure always played a big part in Japanese city growth and design. Especially after the industrial revolution this became very visible. Private owned railways and therefore resulting competition have always had a big impact on the urban landscape. Today’s biggest centres such as Shinjuku, Ikebukuro, Shibuya, Tokyo (Station), Ueno and Shinagawa for example all lie along the circular “Yamanote” Line, which is still the most important course as well as the descendant of Tokyo’s first metro lines.

These points were hereby established as Tokyo’s centres of infrastructure and other train, metro and bus lines connected to these spots and created new ones on their way. More and more centres emerged depending on the conditions, on how many people would need to pass by, predominantly for changing the means of transportation.

The reason I used the word “centre” is because in this complex city shape there is a common behaviour. Whenever there is a metro or train stop you will find commercial buildings or at least small stores close by. This in return will attract more people and in the end you will encounter many people on the streets, occasional shoppers and constant commuters.

When walking away from these points of interest tension will decline and so will the commercial spots and shopping opportunities. Soon you might find yourself in a residential only area. Small alleyways lined with tiny wooden houses are just around the corner of huge commercial streets or even highways. Eventually this results in a continuous change of density around the city as a consequence of sheer pragmatism.

External sources:

5: Richard Koo and Masaya Sasaki, Obstacle to Affluence: Thoughts on Japanese Housing, 2008, p.1

6: http://www.dores.lv/news/charm-land-rising-sun-interesting-facts-houses-japan/ (12.09.2018)

Images:

⑧ High contrast in building size, self-made photo, 2018

⑨ City from above, self-made photo, 2017

⑧

Chaotic Nature

A vast concrete, steel and neon sprawl stretching seemingly to infinity, the world's largest megalopolis is a place of superlatives; circumstances which came about a combination of factors such as a history of partial rebuilding due to big catastrophes, the firm economic drive and the shortcoming of sentimentality as visible in contrast to European cities.

⑨

Apart from the blatant differences in density around the region there is noticeable contrast on a smaller scale as well. A twenty story concrete building next to a traditional wooden two story house is not an unusual sight in Tokyo. There are a lot of small plots with private owners all over Japan. Huge companies such as Mitsui Sumitomo or the famous Mori Construction bought these small private lands one by one and were allowed by authorities to build huge buildings once they gathered enough land.

As for the legal issues, Japan is a country uncompromisingly driven by its economy. Construction laws are made flexible for the big companies if they offer an option that's creates revenue and "public spaces" around them. Someone might also argue that big concrete buildings were built around traditional wooden houses in order to protect them, as Tokyo has a pronounced history of earthquakes and therefore fires resulting from the tremors.

And this brings me to the next essential point on the route to get a grip of the reasons behind this unique cityscape. In the introduction of Richard Koo's and Masaya Sasaki's research paper "Obstacle to Affluence: Thoughts on Japanese Housing" they issue following statement regarding Japan: "Houses here last only about 30 years on average, effectively making them a durable consumer good, whereas in Western countries a house is a capital good (...) The market value Japanese houses falls even faster than they can be depreciated for tax purposes; after 15 years the typical house is worth nothing."[5]

So in Japan, building a home is comparable to buying a car. Houses decrease in value with age from the minute they are finished. Not many buy a used house and if so it is usually teared down to make space for a building a new one. This is an astounding condition, the result of a combination of reasons. I will attempt a simple explanation along the historical timeline. The traditional houses of the past were all built in wood and still today 58.9 % of homes in Japan are built from wood.[6] Not only does this construction method allow for quick assembly and even quicker dismantling but can also withstand earthquakes better than a brick or stone building might have done. Needless to say, seismic activity in Japan is one of the highest in the world.

⑩

Cosy Corners

Even when situated in a huge shopping or commercial area it will not take a long walk to encounter a situation like this. Plant pots, umbrella stands and decorative elements are taken to the tiny alleyways. Unlike in European cities, where those things usually end up inside the flat or maybe in the hallway of a tenement, the inhabitants of Tokyo are occupying the streets all over the city creating a vivid spectacle. Therefore they are creating semi-public gardens, a behaviour which is supported by the government.

⑪

Car Parking Situation

Most properties are severely overbuilt. The few remaining spaces are being utilised intensively. Cars are transported up and down inside this structure. Tokyo does not have strict building regulations on facades or roof shapes. Nor does it dictate an exact height. A uniform townscape is not the goal, but the city is shaped according to neighbourhood interests such as sufficient direct daylight.

External sources:

7: Yoshida Kenko, Essays in Idleness, between 1330 and 1332

8: Richard Koo and Masaya Sasaki, Obstacle to Affluence: Thoughts on Japanese Housing, 2008, p.2

9: Elisabeth Braw, 2014 (https://www.theguardian.com/sustainable-business/disposable-homes-japan-environment-lifespan-sustainability)

Images:

⑩ House facade in Tsukushima, self-made photo, 2018

⑪ Parking Tower, self-made photo, 2018

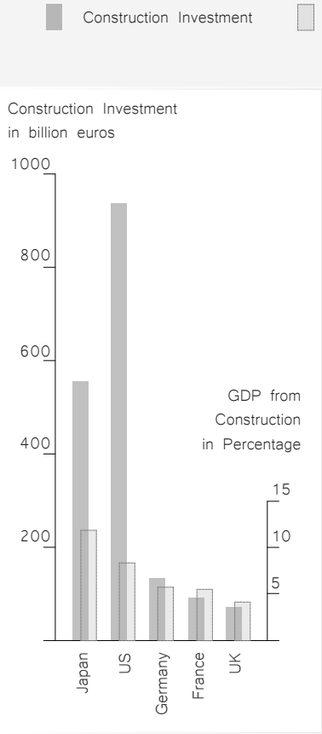
In addition to this the skeleton construction enables an unrestrained flow of air though the house to deal with the humid summer heat. “A house should be built with the summer in mind. In winter it is possible to live anywhere, but a badly made house is unbearable when it gets hot.” As the famous Buddhist monk Yoshida Kenko wrote in his “Essays in Idleness”[7] in the 14th century. This approach is still noticeable today and contradicts the northern European mind-set where a well-insulated building is the norm.

Tough in conclusion wooden houses in general are less durable and, compared to the European stone houses, more vulnerable to parasites or fire. Addressed fire hazards and obviously big earthquakes destroyed huge parts of Japan on numerous occasions. Consequently there was a high demand for housing and this need ought to be met immediately. So it came as no surprise that the majority of new residences were in a poor condition as quantity overruled quality. Not long after this these houses are to be rebuilt again. A totally different situation to one seen throughout Europe, where houses get more and more valuable over time and are therefore often protected against demolition rather than being rebuilt.

Today another factor joins in, perceptible most of all in the capital. The property prices in Tokyo rank amongst the highest in the world and are still rising. The price of the land exceeds any given residence built on it. This provokes extreme circumstances with building types emerging which not many people would have thought of. Enclosed Parking Towers, like shown on the accompanying page, are a common sight. The price of energy consumption or the construction fees cannot in the slightest compete with the property tags. This conditions paired with the culturally inherent preference to own a newly built home, already existing homes are accounting for only 13.1 percent of total sales.[8]

This in turn explains why *“Japan has almost 2.5 architects per 1,000 residents whereas Britain only has half an architect per 1,000 residents. The US has only 0.33 architects per 1,000 residents and Canada has 0.22. Japan, in other words, has 11 times as many architects per capita as Canada.”*[9]

In 2003 construction investments contributed about 10.8 percent to Japan's GDP, compared to 8.3 percent in the United States and only 5.0 percent in Germany. Correspondingly, the Japanese construction business constitutes a vast public employment system, which is composed of about 570,000 companies that directly employ 10 percent of the total working population.[12]



Total Living Industry[13]

The big railway companies, which are mostly run privately, are also in charge of many other industry sectors. They are amongst the biggest real estate owners and project developers for residential settlements. Amusement parks situated at the last stop of one of their train lines are not a coincidence. With their unrestrained economic power these companies monitor the life of millions.

⑫

External sources:

10: André Sorensen, Carolin Funck, Living Cities in Japan: Citizens' Movements, Machizukuri and Local Environments, 2007, p.92

11: Broadbent, Comment: The Institutional Roots of the Japanese Construction State, 2002, p.43

12: André Sorensen, Carolin Funck, Living Cities in Japan: Citizens' Movements, Machizukuri and Local Environments, 2007, p.93

13: Christian Teckert, Total Living Industry. Strategien privater Stadtproduktion in Japan

Images:

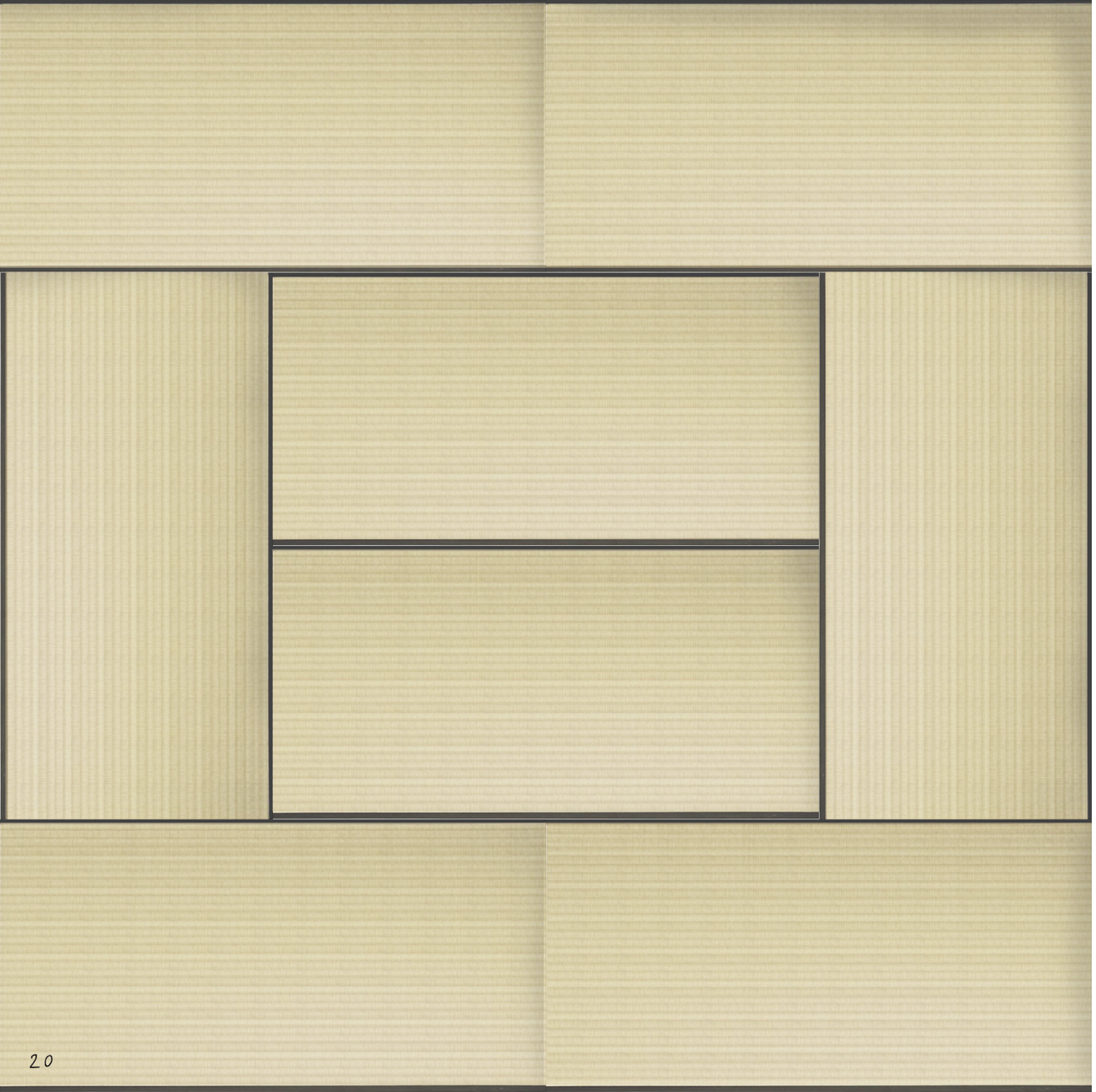
⑫ Ueno shopping street, self-made photo, 2017

The high number of architects suggests that there is a lot of construction going on constantly. Driven by the vast infrastructure developments the construction and public works sector became Japans largest industry.[10]

"A construction state (doken kokka) can be defined as a government which puts much more public investment into the construction of public works than can be realistically justified by the public need."[11]

The constructing industry is in charge. A condition which is perceptible when strolling around the streets of Tokyo. Huge pieces of infrastructure cut inside the fabric of the city. Rivers are built over with huge highways and concrete towers mushroom between the remaining historical buildings. All these interventions seem to happen with very little sense for sentimentality. Many things seem out of scale and out of context. There seems to be no prevailing style of architecture, no context core for new buildings to harmonise with. Whole blocks of the city disappear and are replaced within the blink of an eye; and this even after the economy collapsed during the economic bubble.

In spite of all this non-compliance the megacity still manages to be pleasant to experience and on a second look it shows a lot of continuity in terms of the structure and behaviour. A different set of rules results in a different city fabric. This somewhat chaotic entity never fails to surprise or impress. Tokyo is an organism with a million of processes happening simultaneously, slightly different to the ones we are used to in the west, and changes form constantly. The city is as versatile as it is adaptable.

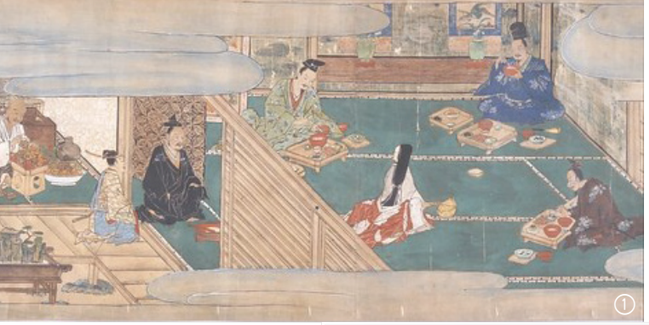


Tatami, a tradition

Tatami mats, as depicted on this page, are an integral part of Japanese culture, not only in terms of architecture but also in terms of sports and religious as well as non-religious customs. Still today many houses in Japan feature at least one room with Tatami covered floor. This type of room is called *washitsu*, literally a “Japanese-style” room. An import principle is to take of ones shoes when stepping onto a Tatami mat. This in turn ensures a clean floor where people can sit and go about their daily routine. Japanese houses and flats are still measured in Tatami instead or next to the metric system even if they don’t feature any Tatami mat.

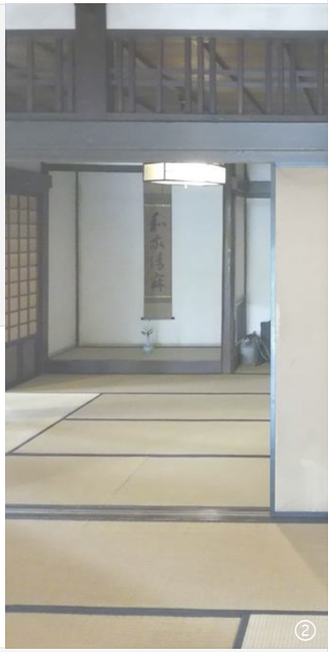
Traditionally a Tatami mat is made from rice straw and the long sides are usually covered by plain cloth or decorative fabrics. Its exact measurements depend on the specific region inside the island. Nowadays other dimensions and materials can be found as well. The common feature which has remained the same is an aspect ratio of 2:1; therefore a mat is twice as long as it is wide. In Tokyo for example the original measurements for a Tatami mat is 88x176 cm, while in the area around Kyoto a mat is usually bigger with a size of 95,5x191 cm.[1]

“Tatami” originates from the term “tatamu”, meaning to fold or to pile. As the name suggests, it used to be a kind of furniture at first. An indication that the earliest versions were thin and could be folded up and stowed when not needed; a luxury item for the upper class which were used to accommodate important guests. Not until the 15th century did the nobility cover entire rooms with tatami mats. Then so-called “zashiki” came into fashion where tatami mats were laid out all across the floor. Soon after, the rooms themselves were designed appropriate to the tatami sizes and the various layout possibilities. Also the partition of the walls and the size of the sliding doors were designed accordingly.



Traditional Daily Life

Daily life in former Japan almost exclusively took place on Tatami mats. Whether it is having dinner, drinking tea, sleeping or having discussions. Tatami is the medium for all routines.



External sources:
1: https://en.wikipedia.org/wiki/Tatami (12.09.2018)

Images:
① Daily Life in Ancient Japan (http://bunka.nii.ac.jp/heritages/detail/193002)
② Tokonoma in Ichinoe Nanushi Yashiki, self-made photo, 2017

Tokonoma

On entering a traditional Japanese-style room the focal point of the room will not be a TV or fireplace, as it might be in a western room, but an architectural feature, known as the 'Tokonoma'. The alcove is raised slightly from the floor, in much the same way that the floor of the room is raised above the level of the entrance or genkan, is an indication of its higher status, within the architecture of the house and is not supposed to be stepped on.

During this era the shoin style developed, which will later be seen as one of the traditional Japanese architecture directions. Tatami matted floors, partitions made with wooden frames and coloured rice paper, square pillars and coffered ceilings are elements in this way of building a home. All this components were resulting from the system established by the size and ordering of Tatami mats.

The centre of the composition of this style is the main room, the shoin, which used to be the study room. Later it became a ceremonial room for meeting guests and it continued to be characterised by built-in staggered shelves (chigaidana), a built-in desk (tsukeshoin) and most importantly a decorative alcove with the Japanese name "tokonoma". Tokonoma are recessed alcoves displaying valuable or beautiful objects the household possesses. Typically they go with a hanging scroll and flower arrangement consistent with the time of year.

Another important architecture direction is the sukiya style, which is a variation of the shoin style with subtle artistic differences. Whereas the shoin style originates from the study rooms in temples and typically incorporated all the built in furniture, the sukiya style was heavily influenced by the tea ceremony. Meaning the rooms had a more modest expression to better suit the "Way of Tea". It is all about understatement and irregularity, at times bordering at rusticity. Sukiya spaces, by contrast, almost never use decorative doors and reinterpret the traditional norms established by the shoin style.

The Tea Ceremony is one of the main Japanese rituals. It is strongly influenced by religion, in this case Zen Buddhism. Intrinsically it is a cultural activity involving the ceremonial preparation and presentation of powdered green tea, matcha, but also variations of that can be seen. This ritual is performed sitting on Tatami mats. Its beginnings date back to the 16th century when wealthy merchants were collecting expensive utensils. One of these merchants, Takeno Joo, took his interest in tea far beyond acquisition and started appreciating it more from a philosophical, even meditational point of view. Soon the "wabi-sabi" ideal, refined rusticity and humility became a central design parameter in Japanese architecture.

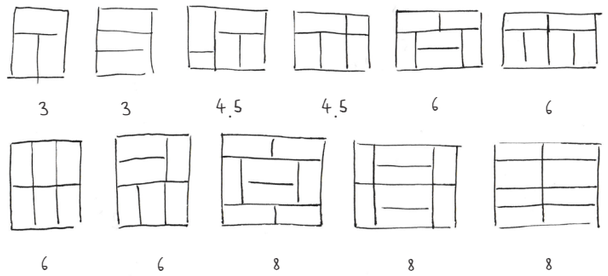
Images:
③ Inside Ichinoe Nanushi Yashiki, self-made photo, 2017

Ichinoe Nanushi Yashiki

On an excursion with my history professor Yoko Itou Sensei we went to this former farmers mansion in the outskirts of Tokyo. It used to be the residence of a wealthy family who were the hereditary leaders of the village situated there during the Edo period. It is still in very good condition and accurately shows all the elements which can be found in traditional Japanese architecture.

Common Tatami Layouts

Tatami mats have been laid out in various ways. The typical Tea-Room used to measure 4 and a half Tatami. When arranging tatami mats, three or more corners should never meet at a single point, as it is said this brings misfortune and/or sickness.



Wabi-Sabi is a Japanese concept of aesthetics, closely linked to Zen Buddhism. At its core, it is the aesthetics of simplicity and imperfection; the conscious handling and appreciation of everyday things even, or rather, when they are getting older.

This trend reached its mature expression under Sen no Rikyu, the great tea master. He continued on the path of simplicity and naturalness. He shrank down the usual 4 and a half Tatami mat sized rooms to merely two mats. In his house he had a very small tea area, just big enough to provide space for two people. And the entrance gate was a very low opening, suggesting that everyone who enters is equal. It did not matter if the participant was a king or a simple rice farmer. The design forces the guests to bend over and enter crawling reminding them of the attitude of modesty.

The Zen Principle went hand in hand with this kind of interior design, the absence of possessions a virtue. The Warrior Class was considered the highest rank during the times of the Shogunates. Being more stoical and having in mind the wars to come they did not value personal belongings the same way European aristocrats did. Also because in Japan there was no place for the same kind of affluent society, the country was less prosperous in general. So it is difficult to tell up to which extent Zen Buddhism influenced this kind of behaviour or the population adapted easily because they did not own many objects in the first place.

In a way Tatami is replacing furniture as seen in western societies. People were sitting on the floor. When needed a small low table was set up. Simultaneously beds were made unnecessary. People were using futons which they put on the floor during the nights. Subsequently the rooms were mostly empty during the day as they did not have a designated use. Only the bathroom, toilet, kitchen and the entrance area, called genkan, were separate. Apart from that living rooms were expressed as ima, which roughly translates to “space”. All the portable objects and furniture were stored in small sections of the house.

Functionalism above all
True to material
Absence of ornaments
Geometrical composition
Universal space

① Adolf Loos, Photo by Otto Mayer around 1904
(Österreichische Nationalbibliothek, Bildarchiv Austria)

Adolf Loos

Was an Austrian architect and writer living from 1870 to 1933. He is considered one of the pioneers of modern architecture. With his project “Haus am Michaelerplatz” he marked the renunciation of decorative elements in architecture, his theory of the “Raumplan”, the considered ordering and size of interior spaces based on function, became an inspiration for future generations of architects.

External sources:
1: Gerd de Bruyn, Fisch und Frosch oder die Selbstkritik der Moderne (Birkhäuser, 2001)

Modernism, a connection

„Look! That is modern architecture! Houses of the future will not be built out of concrete (...), the house of the future is made out of wood! Like the small Japanese houses. It has sliding walls! Modern Architecture is: Japanese culture plus European tradition!“[1]

– Adolf Loos

Japans gate to the west

The World Exhibition, introduced in 1851, taking place regularly in different countries all over the planet, has always had a strong impact on the architecture discourse. It was also the place where Japan was finally introduced to the world. The exhibition in London, in 1862, already featured a wide range of Japanese arts and crafts. The visitors were positively impressed by the strong concepts, the clarity of the statements and the authenticity of the materials.

Some of those qualities were more or less successfully adopted by the modernist architecture of the western world. Many of those influences remained until today. For example to get rid of the ornament, authenticity in structure and material, the separation between skin and skeleton, flexibility and modularity and most of all simplicity and reluctance; to what can also be referred to as “Less is more”, to quote Mies van der Rohe.

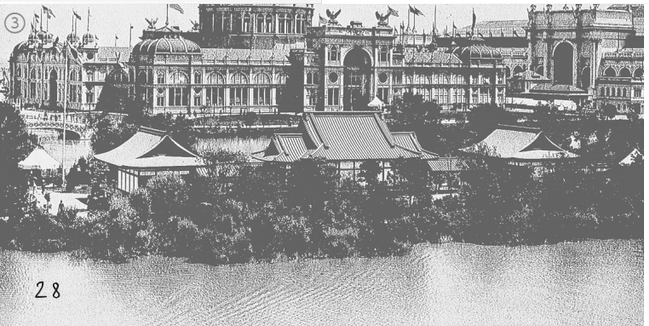
Josiah Conder

Was a British architect and living from 1852 to 1920. As a young architect he was invited to teach western style architecture and architecture history in Japan and ended up building over 50 western style buildings in Japan. He ended up an essential influence on Japanese architecture of the early 20th century.

Ho-O-Den

This historical photo taken during the world exhibition in Chicago in 1983, shows the Japanese pavilion in front of the American government building.


② Josiah Coner, (http://collectionsblog.aaschool.ac.uk/the-aa-reaches-japan-1877-josiah-conder/)


③ The Ho-o-Den in Chicago 1893 (http://www.ndl.go.jp/exposition/e/data/L/208l.html)

External sources:

2: Pippo Ciorra, The Japanese House - Architecture and Life after 1945 'I Love Japanese Culture' (Marsilio Editori, 2016)

3: Clay Lancaster, The Japanese Influence in America (New York: Walton H. Rawls, 1963)

Japan's intentions during the late 19th century however can be described as a calculated attempt to catch up on Western industrial standards and to absorb European and American culture at every possible level. At the time the Meiji emperor was restored as head of Japan in 1868, the nation was a militarily weak country; its economy primarily based on agriculture, and compared to western nations with very little technological development. It was a country controlled by hundreds of semi-independent feudal lords, a country which ought to make rapid progress in both technical and cultural matters to not fall behind for good.

In the following years many scholars and experts from all kinds of professions were invited to teach and conduct research on the island. Essential for the architecture discourse was Josiah Conder, a young British architect who was requested to assume the chair at the Imperial College of Engineering in Tokyo, where he was teaching about architecture history, more precisely history of European architecture. He designed and built many government-commissioned buildings in his time in Japan and was a big influence on his colleges. In that way he educated the first generation of Western-style Japanese architects and soon red brick buildings and neoclassical villas were popping up scattered across the city. The approximation to Western standard was not only felt in terms of architecture but also in the way how people dressed and behaved. This simplified access in turn did also spark an increased interest from abroad.

"*Japan was no longer a far away, remote place located beyond the clearly defined bounds of exoticism, but simply another of these centres, conceptually equidistant and part of the worldwide artistic and political scene just like all the others.*"[2]

The world exhibition in 1893, taking place in Chicago, was another step towards those developments. The Japanese pavilion was inspired by the "byodo in" temple, an ancient Buddhist sanctuary and more precisely the "Ho-o-den", the main building in the temple premises. Clay Lancaster, an American architect and expert on this topic, claimed that the Ho-o-den demonstrated a building could be "unmasked and beautiful, human in scale and appealing... that architecture – real architecture – need make no apologies for its use of simple, everyday materials."[3]

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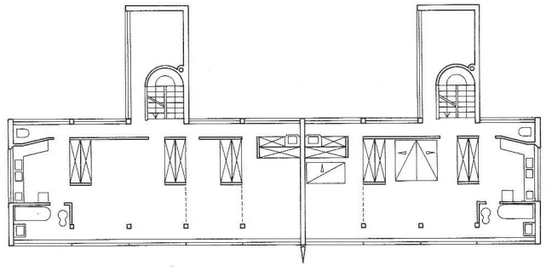


External sources:

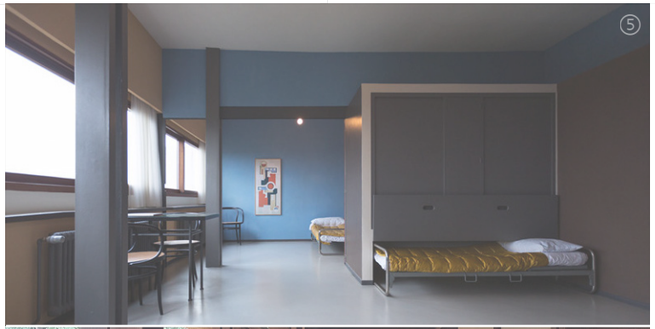
4: Karin Kirsch, Die Rezeption von Japan in der westlichen Moderne (http://www.unprivatehousing.com/topic/research/rezeption%20in%20der%20Moderne.htm 12.09.2018)

5: Le Corbusier, Towards An Architecture, 1927

Images:

④ & ⑤ Floorpland and Photogrpah of 'Weißenhofsiedlung' (https://www.archdaily.com/490048/ad-classics-weissenhof-siedlung-houses-14-and-15-le-corbusier-and-pierre-jeanneret?ad_medium=gallery 12.09.2018)

⑥ Ichinoe Nanushi Yashiki, self-made



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⑥

Weißenhofsiedlung - Ichinoe Nanushi Yashiki

Le Corbusier's contribution to the settlement "Weißenhofsiedlung" bears a lot of elements similar to the ones characterising traditional Japanese architecture. The convertible main room with the service rooms left aside, sliding doors to enable a change of use, square pillars and low beams.

Adolf Loos and also Frank Lloyd Wright were among the visitors of this exhibition.[4] While Wright became known as an admirer of Japanese art and culture and even built in Japan, it is difficult to say up to which extent Loos was influenced by this experience. However there are some notable parallels. His careful selection of materials, passion for craftsmanship and use of 'Raumplan', the considered ordering and size of interior spaces based on function, are still admired. The space design in a Loos building is clear and open, also because of built-in furniture already in place aligned with the design concept. The Japanese equivalent could arguably be the 'Tokonoma' itself, an essential element in traditional Japanese interior design

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Also Le Corbusier needs to be mentioned at this instance. Even though we know that he never went to Japan himself the idea of the house as "a machine for living in"[5] bears resemblance to the design of traditional Japanese homes. The closest analogy is his contribution to Stuttgart's housing development project "Weissenhofsiedlung" commissioned in 1927. It featured a double house with sliding walls as a way of partitioning the space; a big main room which had no fixed purpose with the secondary rooms such as kitchen and bathroom tucked away at the end of the house. This is very similar to the layout of a traditional Japanese house where the main room can be adapted to suit many purposes by moving the shoji and tatami mats, whilst the kitchen and bathroom are built as extensions on the side of the house.

Again it is not said that there is a direct connection between Japanese traditional architecture and the early modernist influences but the parallels become very apparent. When Modernism arrived in Japan in the mid-1920s, there were some architects designing houses in the newest style already. Antonin Raymond, a disciple of Frank Lloyd Wright, was considered one of the fathers of modernism in Japan but also Yoshiro Taniguchi attracted attention. The most notable architect designing in modern style however was Sutemi Horiguchi. When travelling to Europe in 1923 he carefully looked at the latest architecture and discovered similar characteristics to traditional Japanese houses in modern European architecture. An affirmation for Japanese modernists to consult their past as a source for new ideas. The traditional house and the tea-ceremony house became evident again.

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⑧

External sources:

6: Joshua Hammer, Yokohama Burning: The Deadly 1923 Earthquake and Fire that Helped Forge the Path to World War II (Simon and Schuster, 2006)

7: Yasuka 2015 (https://www.kcpinternational.com/2015/07/the-great-kanto-earthquake/)

Images:

⑦ & ⑧ USGS/George A. Lang Collection, The Great Kanto Earthquake (https://www.theatlantic.com/photo/2011/03/1923-kanto-earthquake-echoes-from-japans-past/100025/)

1923 was a memorable year for Japan, the year of the Great Kanto Earthquake, the seismic activity causing the highest death toll throughout the country's history. The epicentre of the earthquake was located just south of Tokyo close to Yokohama and left both cities devastated.

"Yokohama, the city of almost half a million souls, had become a vast plain of fire, or red, devouring sheets of flame which played and flickered. Here and there a remnant of a building, a few shattered walls, stood up like rocks above the expanse of flame, unrecognizable... The city was gone."[6] as written by Henry W. Kinney, an editor for Trans-Pacific Magazine, who was in Yokohama when the disaster struck.

While the magnitude of the earthquake was enough to destroy parts of the cities the immediate aftermath was the true destructive force. A huge Tsunami was triggered just minutes after the quake hit and fires caused by the tremors were roaring through the countless wooden houses of Yokohama and Tokyo.

In the end 60 percent of Tokyo's population was without a roof and as much as 80-90 percent of Yokohama's houses were burned to the ground. The total death toll from the disaster is estimated at about 142,800, which is the highest number of all-time resulting from an earthquake even though the magnitude of the tremors was not as high as in other recorded ones.[7] The enormous scope of the incident is due to the time when the disaster occurred. The earthquake hit at 11:58 midday, when the majority of the people were cooking lunch. Therefore most of the damages and deaths were attributed to fires started by overturned cooking fires. The traditionally predominant wood and rice paper homes did not stand a chance.

This is one of the main reasons that nowadays the city of Tokyo does not feeture a lot of historical buildings anymore and the population does not have the same feeling of sentimentality we are used to in Europe.

External sources:

8: J. Charles Schencking, The Great Kanto Earthquake and the Chimera of National Reconstruction in Japan, 2013

9: Joshua Hammer, Smithsonian magazine, 2011

Images:

⑨ & ⑩ The Uenoshita apartments (https://www.japantimes.co.jp/life/2017/05/20/lifestyle/looking-back-final-days-dojunkai-apartments/#.W5kl6-gzaUk) 12.09.2018

⑨

⑩

Dojunkai Housing Corporation

Giant blocks of concrete emerged scattered all across the city just one year after the incident happened. Obviously complying with modernist standards Japan saw a huge number of apartments in western style getting built. This newly imposed lifestyle stood in stark contrast to the usual Japanese daily routine and caused a huge change in values.

Following the catastrophy a nation was stunned and disillusioned. A seemingly insurmountable task of rebuilding everything was lying ahead. There were even discussions about moving the capital once again to avoid future suffering. But Japan took note. The Kanto earthquake was carefully studied and documented. Numerous safety measures were implemented and changes in construction style were performed. Within a tragedy a new opportunity revealed itself.

A concept was to try out western ideas of Modernism, more precise to allocate 'modern' low cost housing for the many. Dojunkai, a corporation set up a year after the incident, provided a huge number of collective housing blocks built from reinforced concrete, which were more prone to fire and tremors. This collective housing meant a denial of principles, like the selection of materials and the manner of entertaining large groups of guests. The small apartments were the place for the family only now.

J. Charles Schencking a historian at University of Melbourne sees the rebuilding of Tokyo as a metaphor for something larger. The earthquake, he has written, "*fostered a culture of catastrophe defined by political and ideological opportunism, contestation and resilience, as well as a culture of reconstruction in which elites sought to not only rebuild Tokyo, but also reconstruct the Japanese nation and its people.*"[8]

Another relevant consequence was a political shift to the right, a newly reinforced nationalism, which paved the way for Japan to become a crucial part of World War 2. Peter Duus, an emeritus professor of history at Stanford, states that it was not the earthquake that kindled right-wing activities, "*but rather the growth of the metropolis and the emergence of what the right wing regarded as heartless, hedonistic, individualistic and materialist urban culture.*" The more significant long-term effect of the earthquake, he says, "*was that it set in motion the first systematic attempt at reshaping Tokyo as a modern city. It moved Tokyo into the ranks of world metropolises.*"[9]

A historical photograph

This picture showing General MacArthur (left) and the emperor Hirohito (right) was taken after Japan surrendered to the United States at the end of World War II. At the time this photo caused a big uproar as the population still saw their emperor as a godlike being and were never supposed to see him. Especially disillusioning must have been the big difference in height and the way the emperor was made to dress.


⑪

External sources:
10: Masahiro Kobayashi, The Housing Market and Housing Policies in Japan, 2016:15
11&12: Hiroyasu Fujioka, A History of the Individual House in Modern Japan, 2016

Images:
⑪ Photo by Lt. Gaetano Faillace, 1945 (https://iconicphotos.wordpress.com/2012/09/28/when-macarthur-met-the-emperor/

After the 2nd World War, which was lost by Japan, the influence of the US occupancy became more apparent. General MacArthur was put in charge to oversee the imminent development inside the country. He enacted widespread economic, military, political, and social reforms. The emperor Hirohito was transformed into a symbolic leader handing over the power to a parliamentary system. It was also the first time in history the Japanese population would see a picture of their emperor. The historic photograph is somewhat unflattering, as it shows the once godlike emperor next to his tall triumphant opponent.

In consequence to the introduction of Democracy, a Constitution inspired by the American one and Gender Equality, Japanese society opposed tradition and feudalism. A huge change of values took place. With the entire destruction taken place during the War, Japanese architects turned their heads to the CIAM of 1929, held in Frankfurt, addressing a similar situation after WW1 people were now facing here in Japan. The country was in need of building residence for 4.2 million households.[10] Many found it difficult to find a roof in the following years.

The disaster manifested itself in yet another way. While people were mostly renting their houses before the war, a law which fixed low rents despite the skyrocketing inflation was imposed in 1939.[11] Therefore landowners whose income depended on the rent eventually had to give up their business.

The government tried to supply public housing but was faced by the problems of finding sufficient large plots to build on, as the masses tried to buy land themselves in and around the bigger municipalities. Hence in 1950 the government set up the Housing Loan Corporation[12], a financial injection for the private land owners. Now it was possible to receive low-interest loans for construction to help build detached homes on small private lots. This meant that the government was backing individual efforts to purchase land and build on it.

⑫

Kiyoshi Seike's House

Kiyoshi Seike lived in a one room house with his family of 5, even though their garden was huge. This small house did not have any doors, not even to the bathroom. In Kiyoshi's architecture, the Tatami came back as moveable furniture and was also used to define spaces in the outside of his houses. Furthermore he was an advocate of one-room architecture.

⑬

Genkan

Genkan is the entryway in traditional Japanese apartments or houses, comparable to the windscreen in Europe. It forms the transition between the outer and inner areas. It is usually a bit lower than the rest of the flat or house and used for leaving ones shoes there before entering.

External sources:

13: Karan P. P., Stepleton K., 1997. The Japanese City, The University Press of Kentucky, Lexington, p.21.

Images:

⑫ Kiyoshi Seike's House (http://comodohome.com/blog/wp-content/uploads/o0640048010707747015.jpg) 12.09.2018

⑬ Entryway 'Genkan', self-made photograph

Eventually the dark clouds dissolved, the chaos left by aftermath of the disaster unravelled itself and the economy was ready to grow. And grow it did; a post war economic miracle occurred, fuelled by the new circumstances and a considerate amount of financial support from abroad. During the economic boom, Japan rapidly became the world's second largest economy, topped only by the United States. More and more people were drawn to the big cities and soon urban sprawl began to define extensive suburban areas. Every tiny bit of land was sold and occupied as the inflation showed no sign of slowing down. Land, so it was believed was the only reliable asset which will always maintain its value.

Self-evidently this led to a shortage of land. Some architects came to the conclusion that there was no use in fighting against this condition but to adapt to these new circumstances. They were proposing "minimum houses", houses were the function should be considered in relation to the building plots and furniture which was appropriate for the limited spaces. An example is Kiyoshi Seike's moveable tatami mat. A concept similar to the mats in ancient Japanese houses before Tatami became the whole floor. The apartment he designed was small and therefore he was proposing a square 2x2 half-tatami platform raised on casters which could be moved to wherever it was needed for daily life.

Functionalism is more important than formalism now. Tokonoma became Genkan. Genkan are entryways recessed into the floor. Unlike Tokonoma they follow one certain purpose; to take off ones shoes before entering the flat or the house and are purely functional. Genkan are one of the few Japanese characteristic that outlasted. A lot of social experiments followed. People continued to move to Tokyo and the bigger cities and were told to have fewer children.

In 1945 it was 28% of total amount of population who lived in the cities, an amount which became 37% in 1950, and that eventually reached a peak of 72% in 1970, showing a drastic shift from a prewar rural society to an urban society, a phenomenon occurred in few decades in the postwar time.[13]

External sources:

14: Jackie Craven, 'What Is Metabolism in Architecture?' 2017 (https://www.thoughtco.com/what-is-metabolism-in-architecture-177292)

Images:

⑭ The Shizuoka Press and Broadcasting Center, self-made photo, 2018

⑮ Nagakin Capsule Tower, self-made photo, 2017

Metabolist Movement

At the CIAM 1959 Kenzo Tange introduced some ideas of his disciple Kiyonori Kikutake. These ideas were labelled "metabolist" because they were showing the concept of a consistent replacement of old parts for newer ones. Soon like-minded Japanese architects were publishing essays under the name of Metabolism. The Shizuoka Press and Broadcasting Center in Tokyo, shown in the picture to the left, gave Kenzo Tange a chance to materialize his Metabolist ideals.

Nagakin Capsule Tower

Just south of the commercial district of Ginza this eye-catching piece of architecture appears. Built between 1970 and 1972 by the Japanese architect Kisho Kurokawa this structure of prefabricated boxes was supposed to be updated over the years. The capsules are connected to the two main supports with only four bolts, which would allow them to be easily disconnected to exchange for more recent models. Each unit measures 4 Tatami.

In the 1960s cities were growing in an unprecedented manner, economically as well as population-wise. Architects were fazed by a potential overpopulation and were looking for ways to cope with this matter.

In 1960 young Japanese architects under the leadership of Kenzo Tange and others, including Kiyonori Kikutake, Kisho Kurokawa and Fumihiko Maki stepped up and presented their ideas. According to them a city or a building needs to adapt and change in regard to the demand. Architecture should be able to expand naturally, almost organically, and if necessary replaced or removed. Especially post-war structures which were built in a rush to accommodate large numbers of people were thought to have a limited lifespan and therefore should be conceptualised to be modifiable later. These avant-garde ideas became known as "Metabolism" a term inspired by the process of maintaining living cells in a living organism.

A particularly vivid example was brought to us by Kisho Kurokawa when he designed the famous Nakagin Capsule Tower in Tokyo. "*Over 100 prefabricated cell-capsule-units are individually bolted onto a single concrete shaft—like brussels sprouts on a stalk, although the look is more like a stalk of front-loading washing machines*"[14]. What began as an optimistic idea never asserted itself, as the capsule units were never updated. For that reason, even though it is still standing up, the capsule tower is just a shadow of its former self, a remnant of a once promising past. The materials could not withstand the test of time and rust, leaks and corrosion strain the building.

Even though the "Metabolism" movement officially had a relatively short lifespan, from its introduction in 1960 at the World Design Conference in Tokyo to the World Expo 1970 in Osaka, the event's impact went far beyond and helps to understand the state of contemporary Japan. After this occasion the architects all went their own way which is in no way controversial as the ideas of the movement themselves are organic.

External sources:
15: Louis Sullivan, 'The tall office building artistically considered' 1896

Images:
⑯ Row House, self-made photo, 2018
⑰ Tower House (http://socks-studio.com/2016/07/22/the-tower-house-by-takamitsu-azuma-1966/) 12.09.2018

Row House

Known as "Sumiyoshi Town House" in Osaka this building is one of the first and most famous completed by the Japanese architect Tadao Ando. The building was done in 1976 and possesses the typical features of Ando's architecture, such as the use of exposed concrete as a building material. The rectangular, two-storey house contains four rooms connected by a central courtyard, where all the windows are situated.

Tower House

An unconventional residential miniature tower which was built in 1966 in a very small plot of land. Takamitsu Azuma built this for his own family. The house grows around the stairs six levels up to provide 65 square meters of living space on a plot of only 20 square metres. The intricate vertical network of rooms is made possible because of the absence of doors.


⑰

Looking back there were a number of features that characterised the Metabolism movement. Large scale structures which are capable of growing organically that do not necessarily base on the modernist principle of "form follows function"[15]. Instead they leave open the option that these conceptualised spaces may adapt to different situations in the future. The function might as well change. Building technology played an important part here. Houses were treated almost like machines and were required to act as ones.

Even though wood has always been the go-to-material in Japanese design of houses, after witnessing the damage dealt by the war, building with concrete became more apparent, with Tadao Ando becoming the central figure on the peak of this development. His "Row House" in Osaka was soon to be taught at the architecture schools all over the world. Concrete as a building material became very popular because of its austere expression and the enabling for complex und unique shapes. As mentioned before its performance against fire or seismic activities as well as stability and durability played a part. In that way something not inherently Japanese at all, concrete as a building material, became typically Japanese.

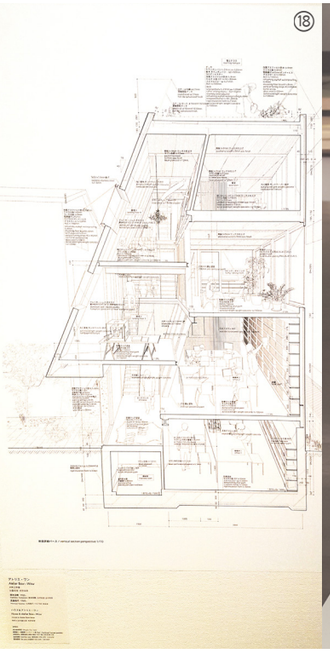
Another prominent example on concrete architecture during this period was the "Tower House" the architect Takamitsu Azuma designed for himself. The building plot was merely a 20 square meter wide gap in a busy central district of Tokyo. What distinguished his house from other projects was the arrangement of spaces throughout the small tower. Starting from the central staircase all the different spaces containing various functions connected vertically without the use of doors. The rooms are piled up on top of each other and engage the inhabitant to constantly move in all three dimensions.

Modernism gradually stopped imposing general design guidelines and it became more and more difficult to judge a building on certain parameters. Universal design methods and otherwise reliable principles were no longer determined as they were declared by famous architects during the 20th century. The 1990s brought a new understanding of architecture in the sense of style pluralism.

House & Atelier / Atelier Bow-Wow

Architects Momoyo Kaijima and Yoshiharu Tsukamoto, co-founders of the highly regarded architectural firm Atelier Bow-Wow in Tokyo, chose a highly problematique site for their own house and office in 2005. The minimal site is enclosed by buildings on all 4 sides with just a narrow corridor towards it. Aiming not to separate the house and the atelier, a composition is reached with lower 2 floors for the atelier and upper 2 floors for the house connected with a staircase.

⑱



⑲

External sources:

16: Hiroyasu Fujioka, A History of the Individual House in Modern Japan, 2016

17: Atelier Bow-Wow, The Architectures of Atelier Bow-Wow: Behaviorology, 2010, p.9

Images:

⑱ Section Sketch at an Exhibtion, self-made photo, 2017

⑲ Section Model at an Exhibtion, self-made photo, 2017

Correlating with Robert Venturi's famous axiom regarding modernism as "either-or architecture" and postmodernism as "both architecture", Hiroyasu Fujioka wrote in an essay: "*I see the shift as being from 'have-to architecture' (in modernism, being functional, reasonable, and ensuring a close relationship between the elevation and the composition of the inner space were a must) to 'can-be architecture' (the ability to embrace different definitions and designs...)*"[16] The architect can basically get away with everything as long as she or he can present the right arguments. The vanishing of shared principles makes it impossible to evaluate what design is good and what is bad.

The modernist idea of "function" was put to the test also by the Japanese architecture firm Atelier Bow Wow. They suggested the word "behaviour". The behaviour of human beings, but also the behaviour of natural elements such as wind, water, heat and light and ultimately the behaviour of buildings and interventions in a larger context. "*Behaviorology attempts to place architecture and urban space in a position where these three categories are effectively synthesized.*"[17] This approach tries to optimise its performance in its specific context.

The Atelier Bow Wow office and house combination they materialised their concept and created a new lifestyle according to their own behaviour. The vertical spatial composition allowed for office and living spaces to coexist and intertwine in a very dense surrounding. The private living and sleeping levels are positioned on top and are connected directly to the rest of the building, including kitchen, working and modelling spaces. The absence of standardised separation of floor levels reveals a similar flow of movement as seen in "Azumas" Tower House.

House NA - Sou Fujimoto Architects

This project, published in 2011, gave the impetus to my masters thesis. Sou Fujimoto gained international recognition when he presented his radical concept on living space. The building is based on a thin, split-level steel frame and represents a fully realised version of a home without the use of traditional staircases.

External sources:

1: https://www.archdaily.com/230533/house-na-sou-fujimoto-architects (12.09.2018)

2: Sou Fujimoto, Primitive Future, 2014 p.24

Images:

① House NA, Iwan Baan Photography, 2011

② House NA, self-made photo, 2017

Today, a conclusion

Less affected by the controversial post modernism and exuberant deconstructivism, Japanese architecture has been following a different path, the synthesis of western individualism and Japanese harmony and self-control. This results in buildings and projects which are sensitive to their surroundings while possessing a strong design concept.

The “NA House” by Sou Fujimoto Architects built in a residential neighbourhood in Tokyo is a suitable example for the rapid change in Japanese architecture in recent years. The project was published countless times in architecture magazines and web pages all over the world because of its unique appearance and its unprecedented conception.

“Described as “a unity of separation and coherence”, the house acts as both a single room and a collection of rooms. The loosely defined program and the individual floor plates create a setting for a range of activities that can take place at different scales. Ranging in size from 21 to 81 square-feet, each floor plate is linked by a variety of stairs and ladders, including short runs of fixed and movable steps. Stratifying floor plates in a furniture-like scale allows the structure to serve many types of functions, such as providing for circulation, seating and workings spaces.”[1]

In his book “A primitive Future” Fujimoto writes about his “Nest or Cave” theory, a concept which resembles the “NA House”: “*Consider the two origins of a “Nest” and a “Cave”. As a functionalist archetype, a nest is prepared according to inhabitants’ sense of comfortability while a cave exists regardless of convenience or otherwise to its inhabitants; it remains indifferent. Upon entering a cave, humanity adeptly assimilated to the landscape by interpreting the various hints of convexo-concave surfaces and scales. This is architecture of unrelated external factors.*”[2]

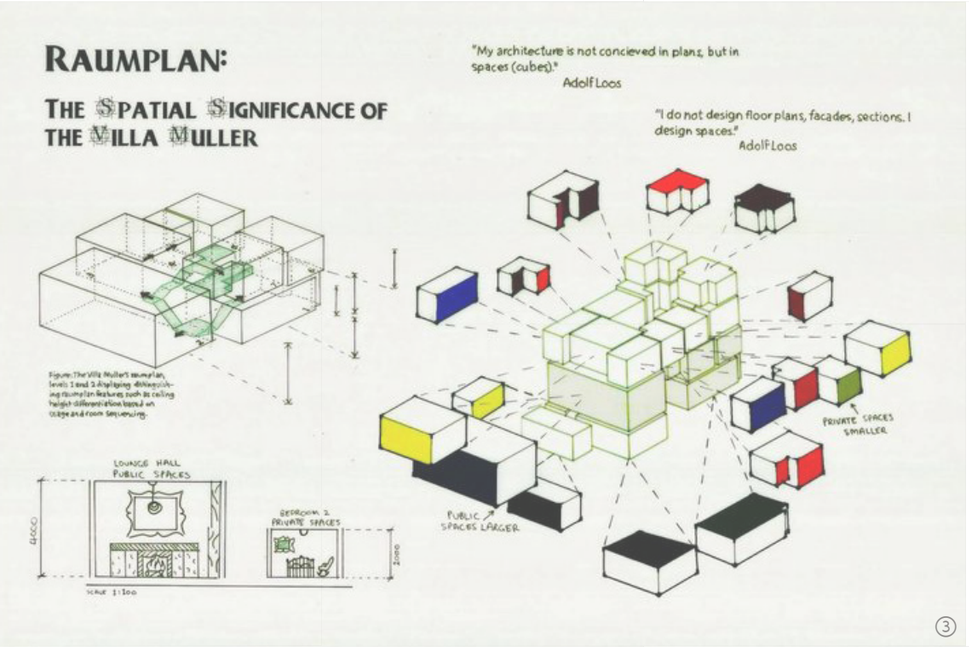
External sources:

3: Fujimoto lecture at the GSD Harvard - https://www.youtube.com/watch?v=MGLO-GPYfbg&t=4734s (12.09.2018)

4: Beatriz Colomina, Sexuality and Space, 1992

Images:

③ Raumplan (https://i.pinimg.com/736x/c9/5c/ef/c95ceff6941d677d40c7c9497f954d37.jpg - 12.09.2018)



③

Raumplan - Adolf Loos

"My architecture is not conceived in plans, but in spaces. I do not design floor plans, facades, sections. I design spaces. For me, there is no ground floor, first floor etc.... For me, there are only contiguous, continual spaces, rooms, anterooms, terraces etc. Stories merge and spaces relate to each other."

- Adolf Loos, Shorthand record of a conversation in Pilsen, 1930

A "nest" is a space that has been designed specifically by its inhabitants to suit them. Flat floors, square doors. A "cave" on the other hand is a naturally formed space. A space which has been encountered, not envisioned. The surrounding is not prepared for unilateral human behaviour. The inhabitant has to rethink and adapt to this new and unfamiliar circumstances. In this sense there are no clear regulations on how to use the space which requires the human to get creative.

The House NA can be seen as a cave as most of the platforms in the inside don't follow a certain need and all of them can be used as a table or a seat from some point of perspective. The floor turns into furniture and it is up to the user to decide on how exactly the spaces are going to be utilised. The platforms invite to permanent change and alter the way in which humans move around in their habitat.

When talking about another of his projects, the "Wooden House" Fujimoto extends this idea of spacial continuity: *"There are no separations of floor, wall, and ceiling here. A place that one thought was a floor becomes a chair, a ceiling, a wall from various positions. The floor levels are relative and spatiality is perceived differently according to one's position. Here, people are distributed three-dimensionally in the space."*[3]

A circulation comparable to the flow of movement in the Loos building Villa Müller; distributing diverse spaces throughout the building differing in size, function and occasionally in material. The Raumplan as applied to Villa Müller is an accumulation of various spaces surrounding the central steps allowing a visual connection between the different areas giving the interior an almost theatrical quality often described as "voyeuristic"[4]. This is an adjective which would be adequate for the House NA as well.

During my time of research I found that the parallels in the way both Adolf Loos and Sousuke Fujimoto are talking about their ideas were becoming more and more apparent. Both the "nest and cave" theory and "Raumplan" describe a similar situation using only slightly different words.

"The platforms can be used as a desk, shelf, bed, chair, etc., extolling the Japanese custom of sitting and sleeping on the floor in a manner that is so pervasive and clear that, while requiring no lengthy description, gives free reign to the imagination."

– Roberto Zancan for DOMUS magazine, 2011

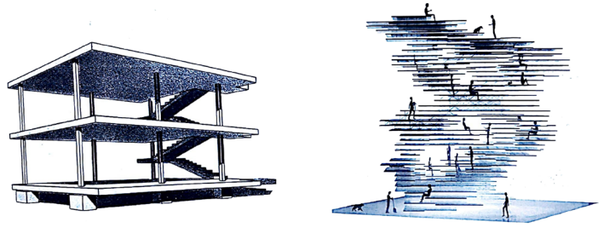
Images:
④ Interior House NA, Iwan Baan Photography, 2011

What both Loos and Fujimoto have in common is the built-in furniture aligned with the general design concept and the renunciation of flat ground plans. The resulting spaces distinguish themselves from the usual ones in the way of using them, enabling a flow of movement also in the 3rd dimension, along the "Z(en) Axis".

While I was working in Sousuke Fujimotos Office in Tokyo I asked him for a short interview on this topic but unfortunately he told me that he did not know Adolf Loos theories very well and he has not, at least consciously, been influenced by them. This was a small setback at the time but nevertheless I found what I wanted to find. Without doubt there is a connection to be made between the traditional Japanese architecture, onwards to the period of Modernism and back to contemporary Japan.

To play with the 3rd Dimension seems a reoccurring element in contemporary Japanese architecture with the given examples in the previous essays. The necessity to make use of every tiny angle found inside the dense city of Tokyo forced to architects to partially leave the path of modernist ideas and arrange spaces with new rules in mind. In the case of Fujimotos project the houses' split levels obviously takes over the task of furniture to some extent. Less furniture and fewer belongings are necessary to use the house from a day to day fashion.

Globalization manifested itself in countless ways. One is a new nomadic lifestyle young people all over the industrialized world are embracing. Less belongings account for less ties. Studying and working abroad short-term is made simple. I envision the future full of modern city nomads who highly approve of their built in furniture and simplistic equipment as most objects are going to be shared with the outside world. Already I feel there is a trend to give less about personal material goods and being more aware about the footprint a person is leaving on the planet. Frugality becomes a virtue again. This might be a trend only in far developed countries and highly educated spheres of society but it is a perceptible movement nonetheless. Zen Buddhist principles reoccur in a western understanding of the future.



NEST

CAVE

⑤

⑥

House NA - Model

This photograph was taken at the exhibition “The Japanese House: Architecture and Life after 1945” at the National Museum of Modern Art, Tokyo which was taking place in 2017.

External sources:
5: Sou Fujimoto, Primitive Future, 2014 p.22&23

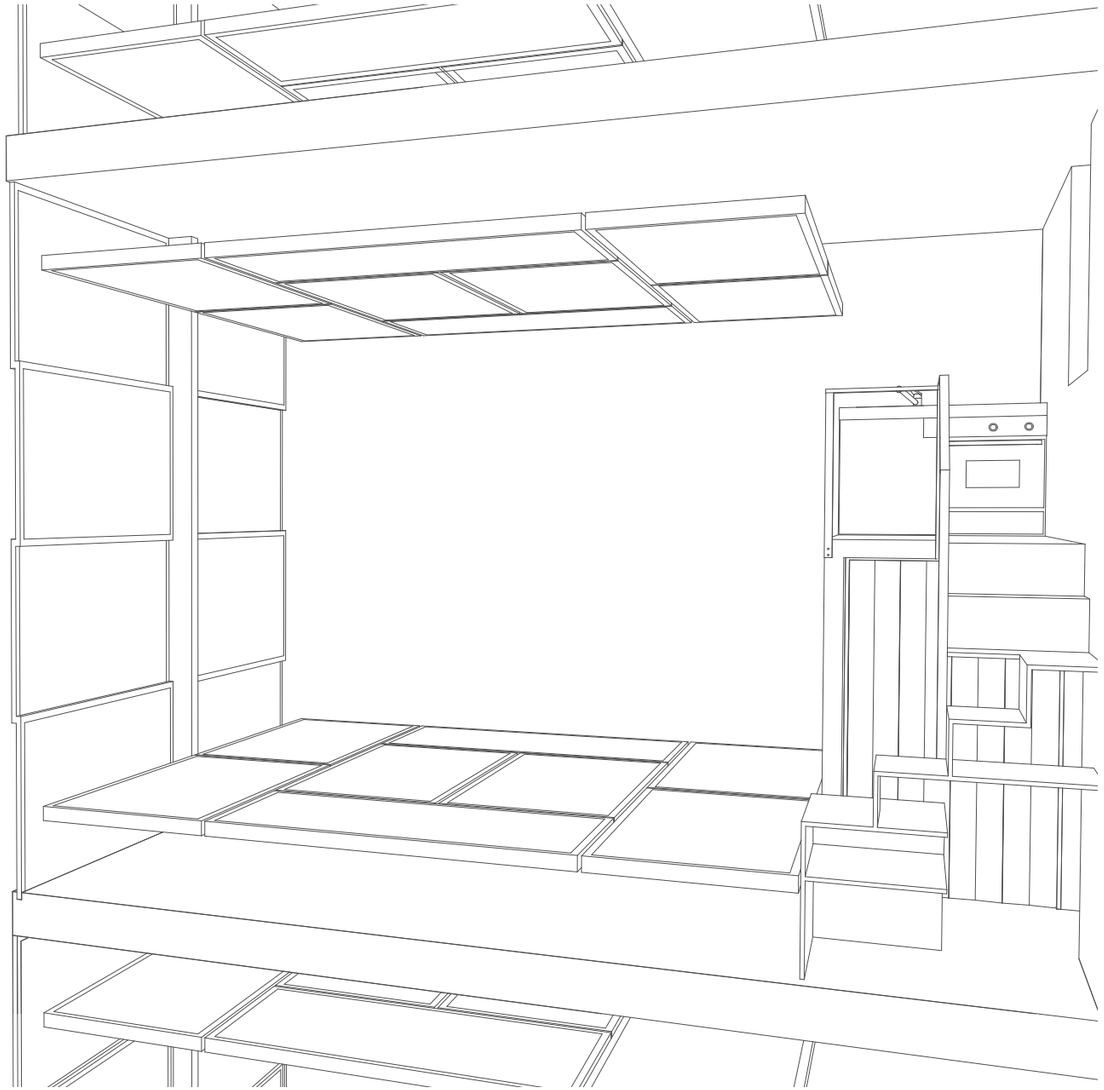
Images:
⑤ Graphic taken from: Sou Fujimoto, Primitive Future, 2014 p.24
⑥ Model House NA at an Exhibition, self-made photo

As of now western countries still very much prefer a loft style living where no separation of space is established in advance and the habitat acts as a flat container for all their belongings. This very much meets Fujimotos definition of a “nest”. While in Japan people seem to be on the brink of switching their nests for caves, in Europe and the rest of the world we might need some more time to rethink this condition.

For me in this uncommon understanding of 3 dimensional spaces became very fascinating and bears a lot of potential even outside of Tokyo if it was not for economical restrictions. Straight floors and ceilings paired with straight room layouts will remain the cheapest and most profitable option to build. There are less possibilities to experiment with living space as a house in Europe is supposed to withstand the test of time and the building design therefore is taken rather seriously; understandably seriously.

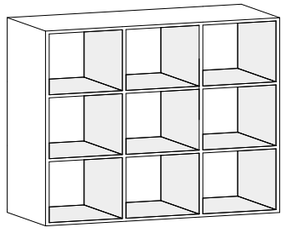
Tokyo is the best environment for architects to romp, when it comes to materializing ones idea. Hence the project I am proposing on the following pages is feasible, according to Jun Sato, a renowned Japanese structural engineer.

It is a “machine for living”, but unlike Le Corbusier understanding of his “Maison Domino”, which was labeled a “nest” by Fujimoto[5], I argue that it is a “cave” as well. The machine adapts to the user as well as the user adapts to the machine; an ambiguous behavior shown by both sides.



A space adaptable to temporary needs. The Tatami-shaped floor and the ceiling take over the task of furniture and vertical development and enable the user to get creative. My intent was to show that most of the time there is not one clear scenario like shown on the following pages. Usually a variety of movements combines to make a living situation.

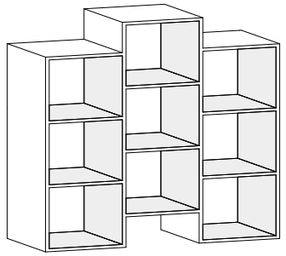
The platforms and the resulting room constellations allow for one's creativity. Ropes can be spanned, hammocks can be suspended and loose and static furniture can be added on top or underneath the platforms. The system which is responsible for the movement of the platforms allows all this as it operates with steel cables and stops as soon there is little resistance to guarantee highest safety standards.



The Unit is an approximately 20m² tiny flat.

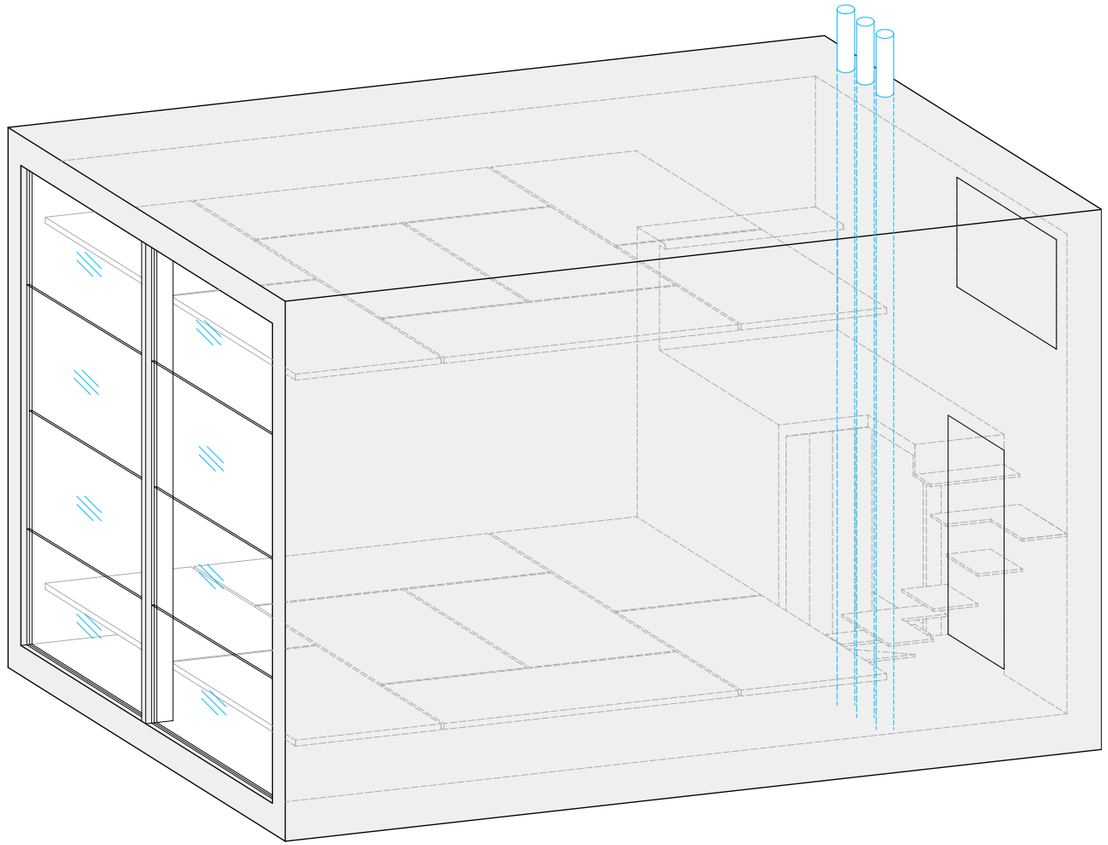
The interior construction can be placed into any kind of grid with the open space measuring 4 by 4 metres.

The grid itself is most likely constructed in plain reinforced concrete with a thickness of 20 cm to easily support its inner workings.

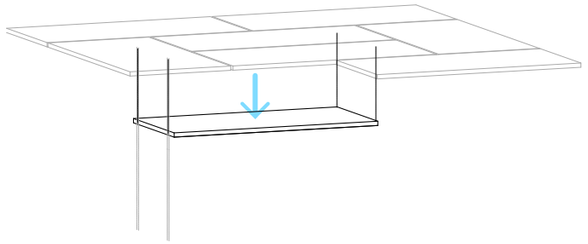


To achieve the smallest thickness of material for the supporting wall a shifted grid would be more suitable. The vertical development of the building however then needs to adapt to make all the units accessible.

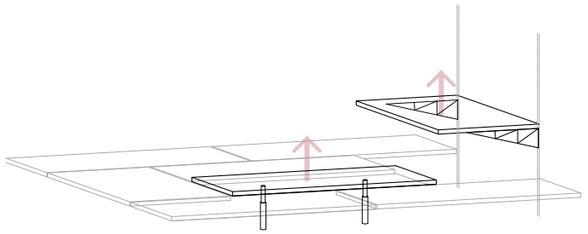
The front is covered by 8 glass panels, 4 of them moveable and the back is covered by a cavity wall to host all necessary pipes and drains.

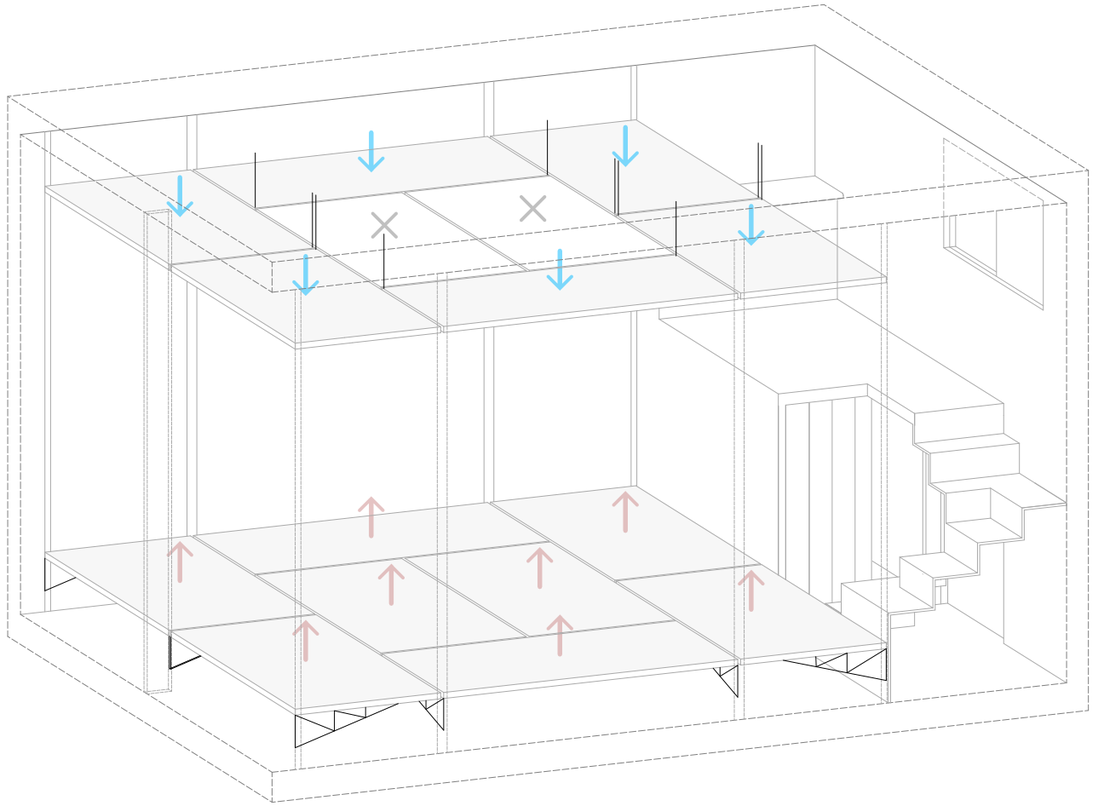


The interior construction most importantly features the moveable Tatami-Platforms. The aim of this project is to generate space by enabling a different scenario for a different use and/or user. The platforms can go up and down and the scenario can change within seconds. Hanging from the ceiling, the platforms on the top can be lowered by extending the steel cables.



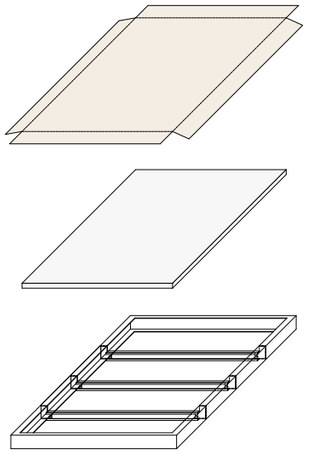
The platforms on the ground can be lifted along rails, if they are connected to the concrete wall. The two platforms in the centre of the room will have to use a different system. The technical background for this project will be illustrated in the “Detail” section.



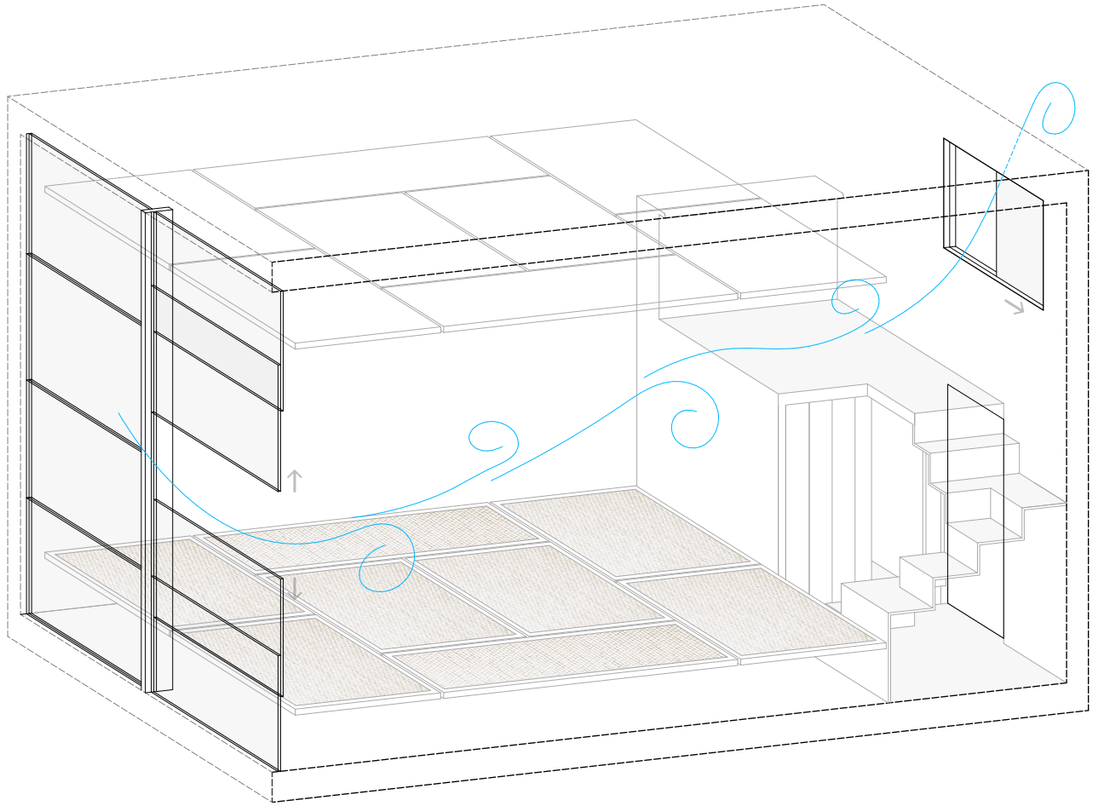


On the front side there is a big window, covering an area of 4x4 metres which is subdivided in 8 smaller parts. For ventilation some of the windows can be slid up or down. On the back side there is another small window just beneath the ceiling above the entrance door. This enables cross ventilation which can replace an air conditioning system to some extent.

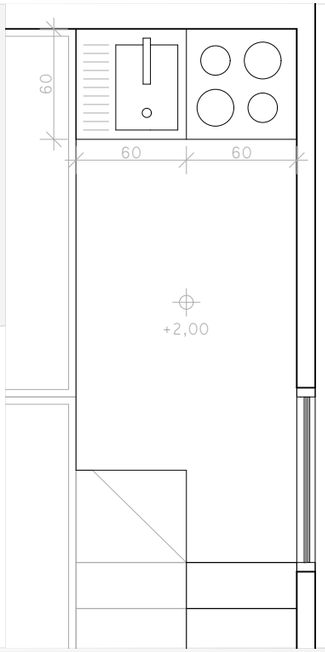
The flooring and the ceiling are made up by steel framed tatami-shaped platforms. Inserted on top of those frames are wooden boards covered by Bolon, which is a woven PVC flooring system that is durable, easily cleaned, and has high performance ratings in residential and commercial applications.



Due to this transformation the Tatami is now more durable and also resistant to water. Its appearance however still reminds of the traditional implementation of a Tatami floor. These boards can be exchanged or turned around to make use of different materials. The surface becomes wood when the board is flipped and reinserted into the frame.

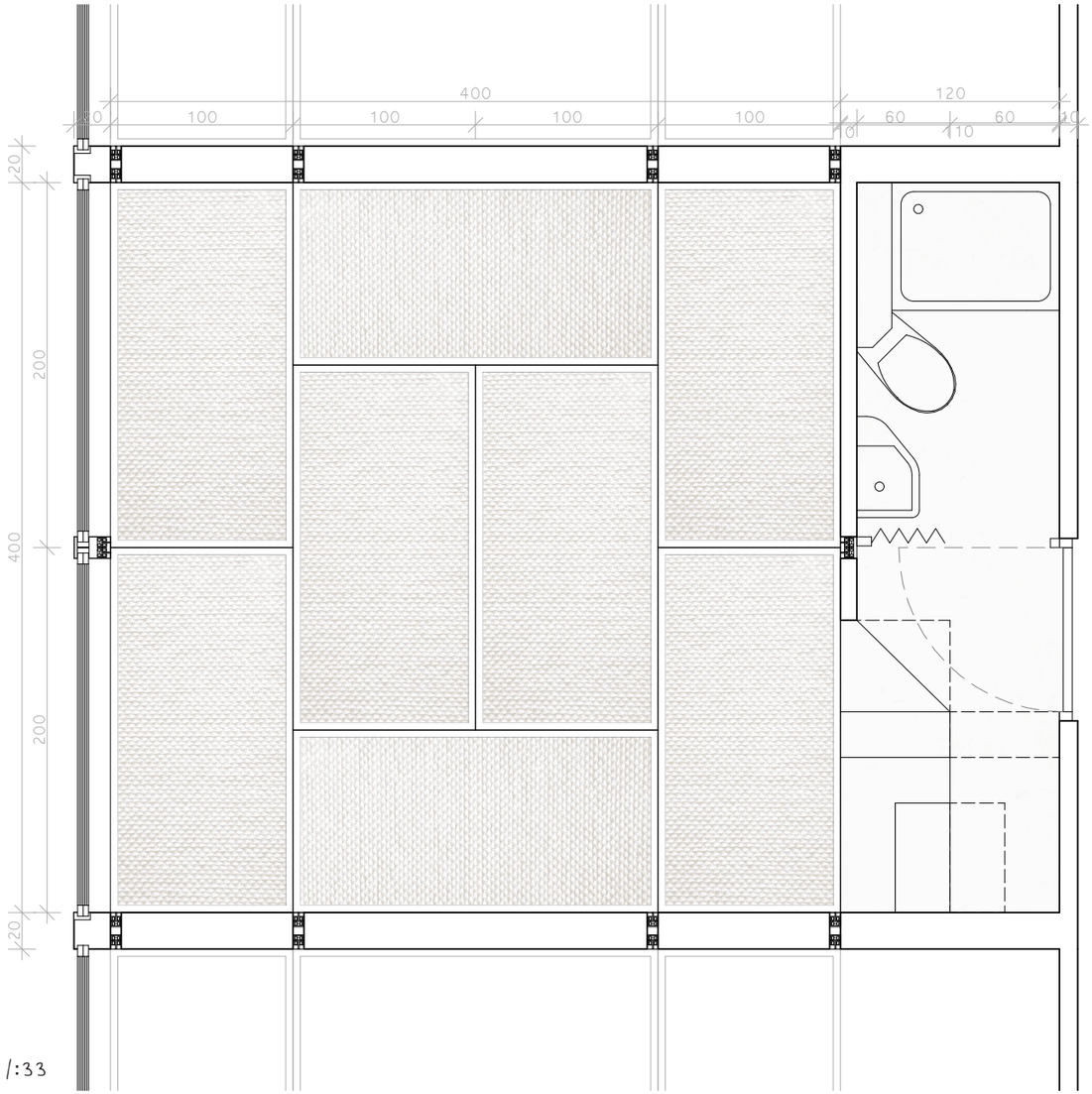


The floorplan shows that majority of the space is used for the Tatami; 8 Tatami or 16 square metres of adaptable space. Only a minimal bathroom with a minimal kitchen on top are treated separately. The bathroom features a small shower, a sink and a rotated toilet seat to keep this room as small as possible, because the time spent inside this room is very limited from a day to day basis.



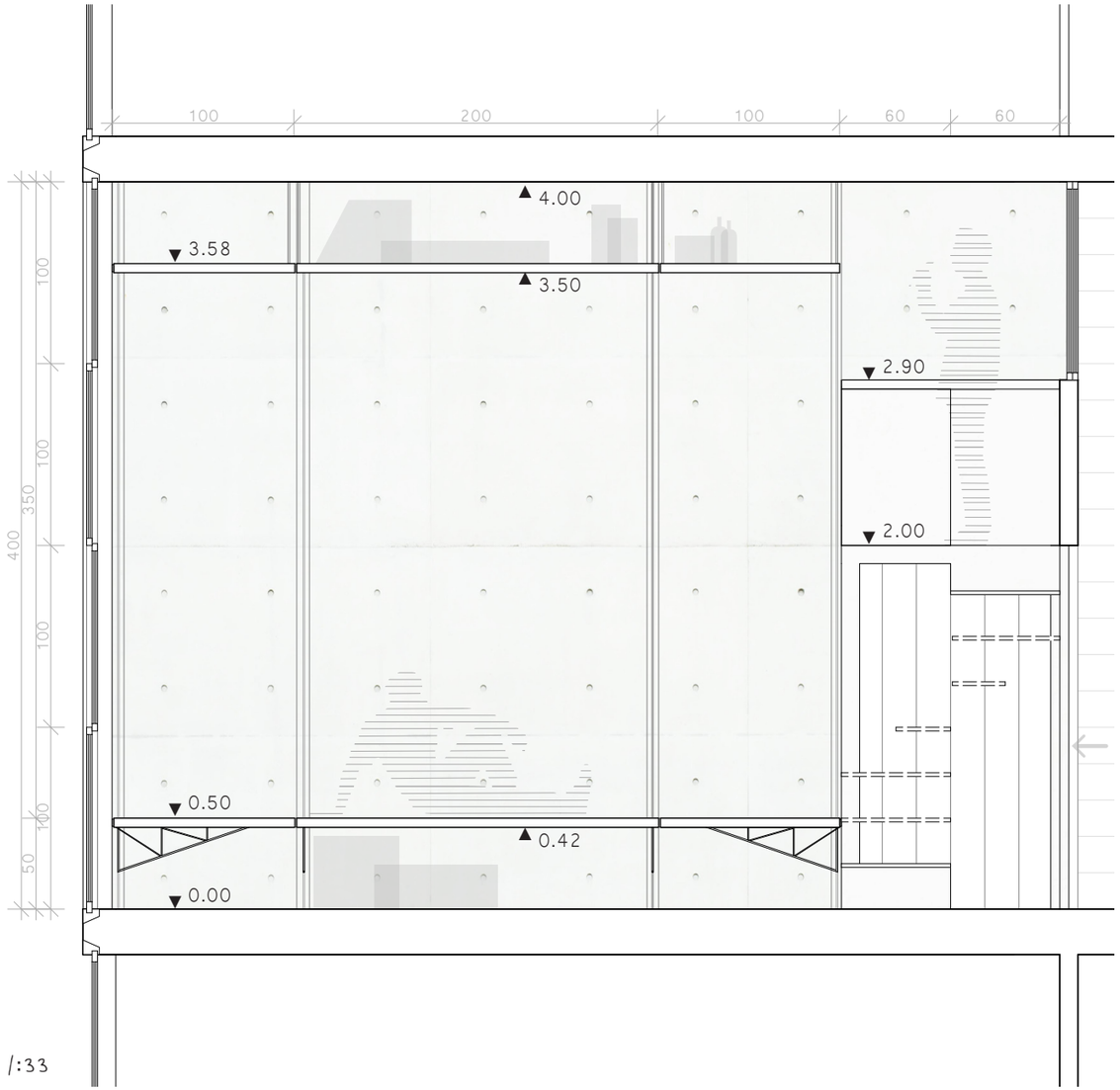
Minimal Kitchen

The kitchen on top shows merely another sink and a hotplate. Especially in Tokyo people do not cook very often and are mostly out eating at small restaurants. When the decision is made to cook at home the kitchen can expand, as demonstrated on the following pages.



1:33

Underneath the floor and on top of the upper platform all the storage for the apartment takes place. In that way the entire room can be used freely. The small image on this page shows the situation when the kitchen work table is lowered. Now the kitchen is extended by a 2 square metre surface to allow for a comfortable preparation of meals.



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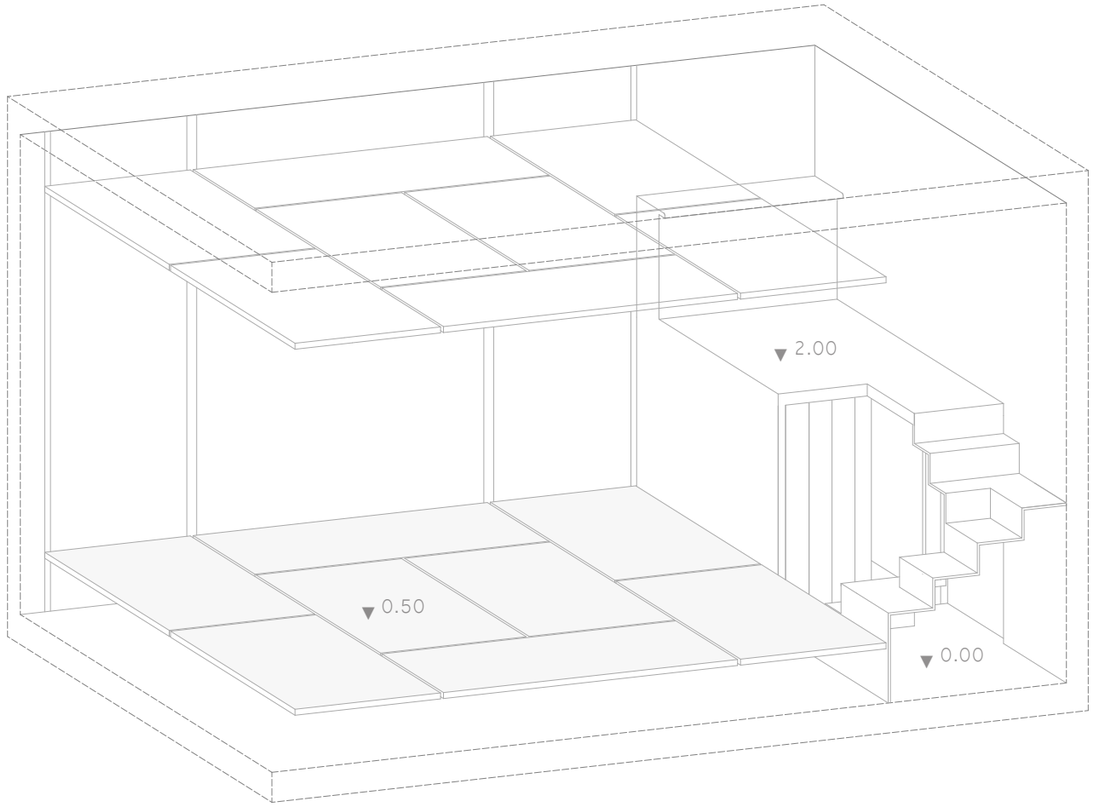
Tatami Room 01 - Tea Ceremony

The basic form is one big empty Tatami Room of 16 square metres or 8 Tatami mats. The size of the Tatami is adjusted to 2x1 metres; a contemporary adaption to fit into the metric system.

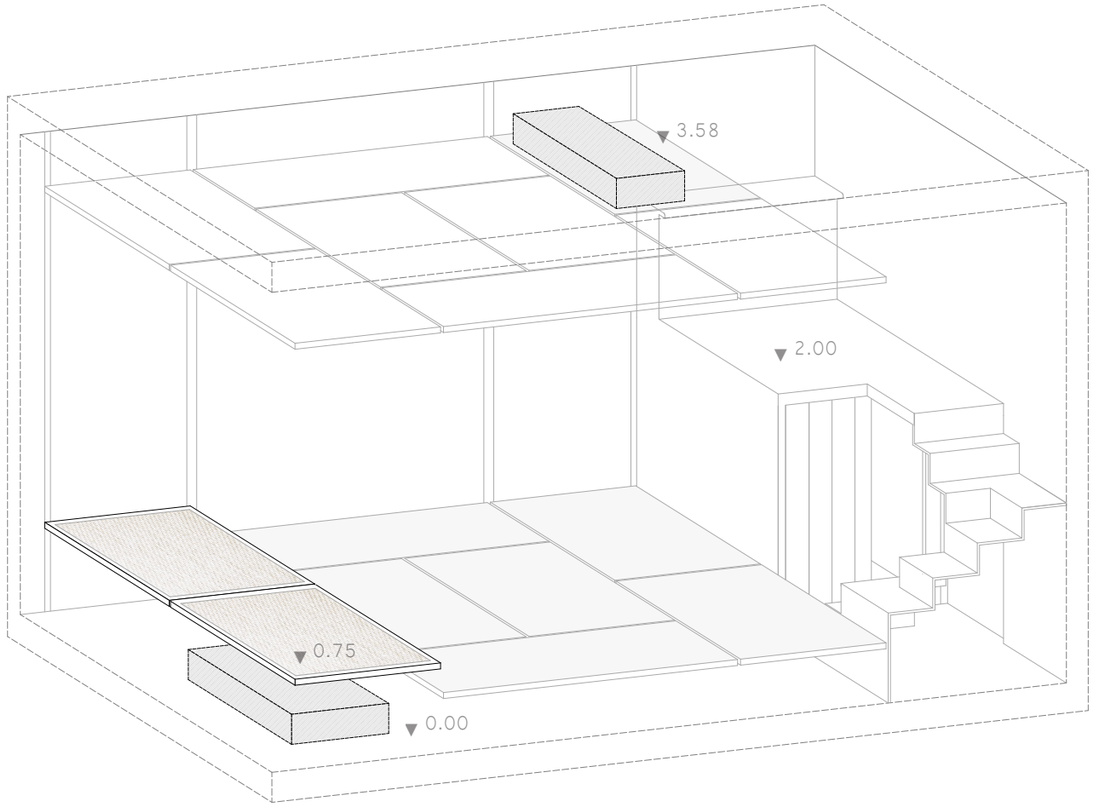
In the basic position the top surface of the lower platforms is at 0.5 m height. The underside of the platforms above is at 3.5 m height. The available ceiling height in between is 3 metres. The room is completely empty. No furniture is necessary.



A very basic transformation is the raising of 2 the platforms in front of the big window. It creates a hierarchy between those arriving at the flat and those who have already been there before. A parallel can be drawn to the inside of Japanese shops before the modernisation. The cosy space next to the big window can be equipped with pillows for the inhabitant to read or relax.

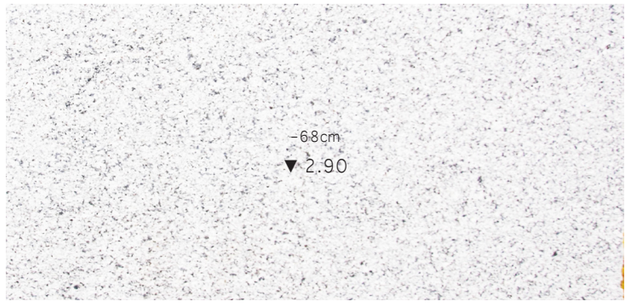
More importantly however it opens up the storage. To make the entire floor available, all the necessary storage has to happen under the floor or beneath the ceiling. Some of the storage above can be easily accessed from the kitchen.

Tatami Room 02 - Storage

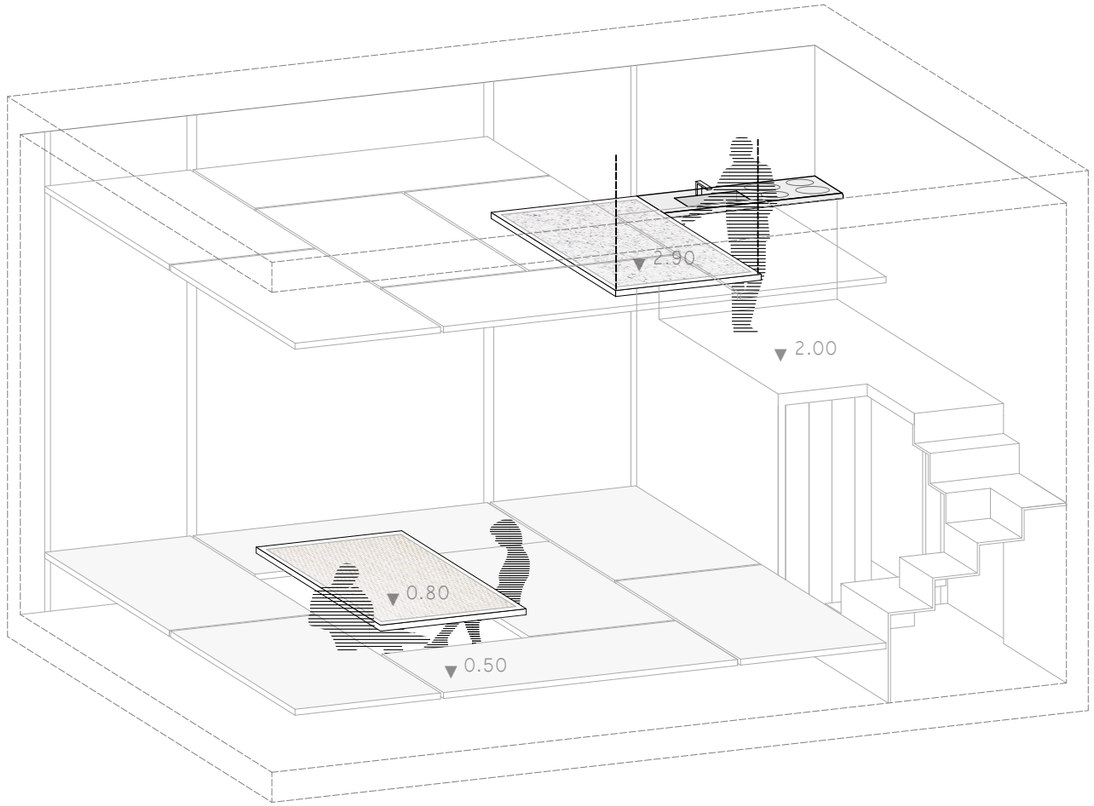


When raising a platform in the centre of the room a small table emerges. The feet go comfortably underneath it. Moreover the height of the table can be adapted to the users comfort.

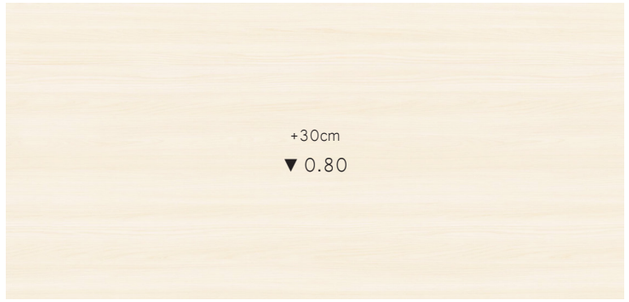
The regular kitchen only features a sink and a stove. Therefore it is possible to suspend one platform from the ceiling transforming it into a big work surface, made of stone or granite, where all the foods and the drinks can be prepared and where the user can access the supplies and kitchen utensils. This worktable can also feature permanent storage in temporary or built-in furniture.

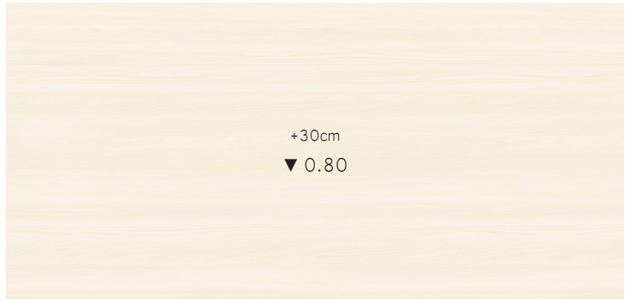


Eat 01 - Small Breakfast

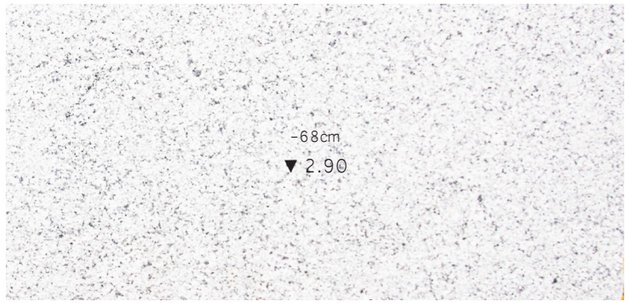


If the company gets bigger a second platforms can be lifted, creating a huge table providing space for up to 12 guests. It is possible to flip over the boards to make use of the slightly harder wooden surface when eating.

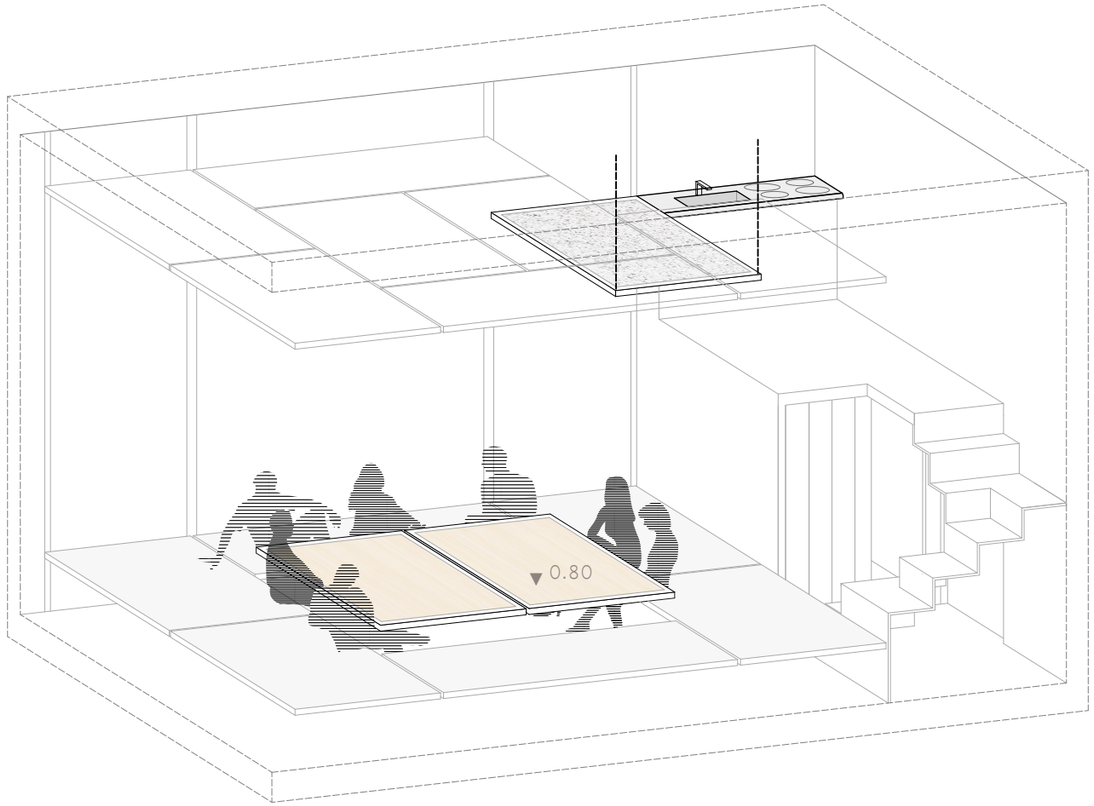




The height in between flooring and kitchen work table remains 2,40 metres.



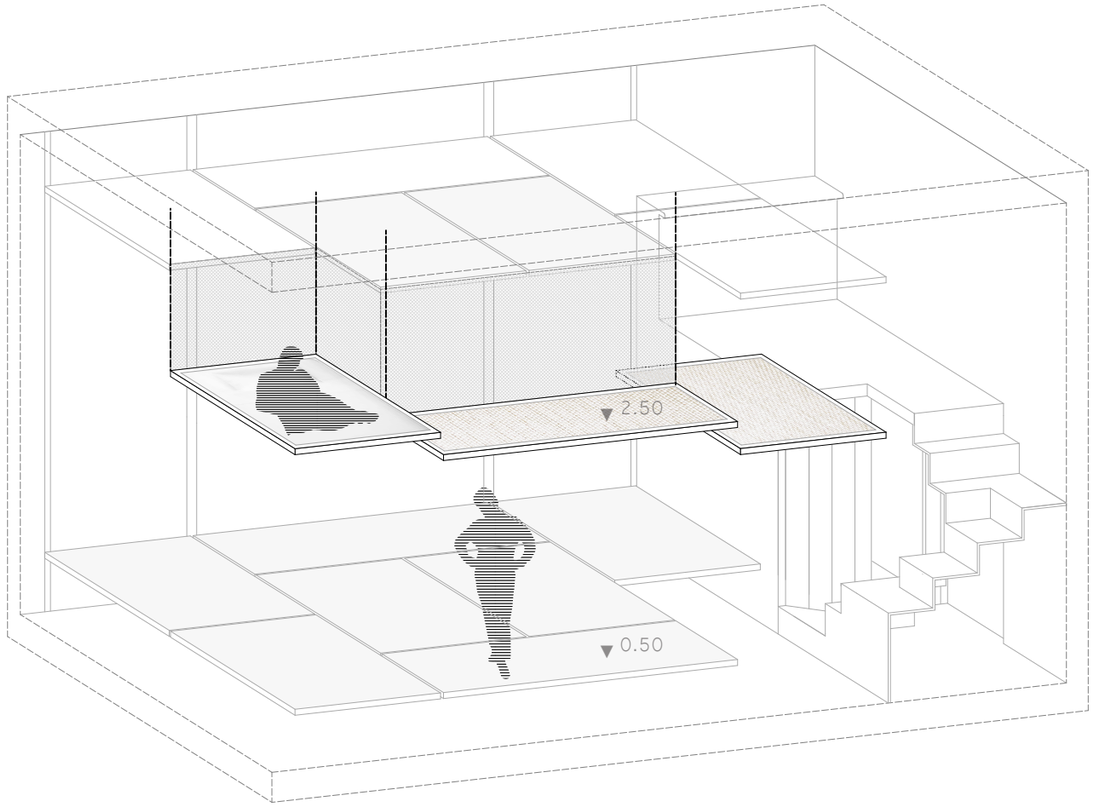
Eat 02 - Large Dinner



Besides nourishment the next fundamental need for humans is sleep. For that a platform equipped with a bed or futon can be suspended next to the front window. For privacy reason it comes down with some cloth sight protection. And two more suspended platforms create a link from the kitchen to walk over. For the rest of the time this platform serves as storage for the futon/bed.

The rest of the room stays intact. The minimum ceiling height at some point is now 2 metres.

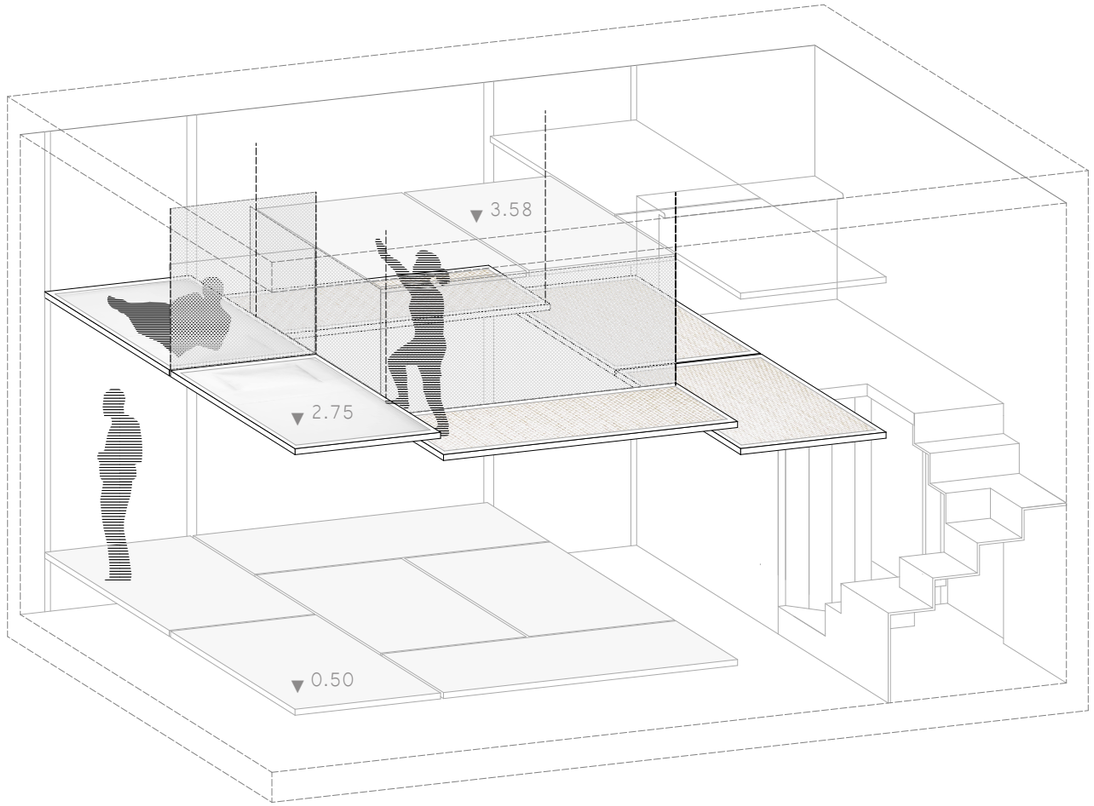
Sleep 01 - Single Supsended Bed

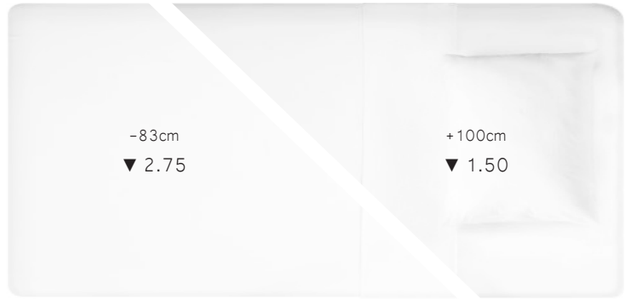


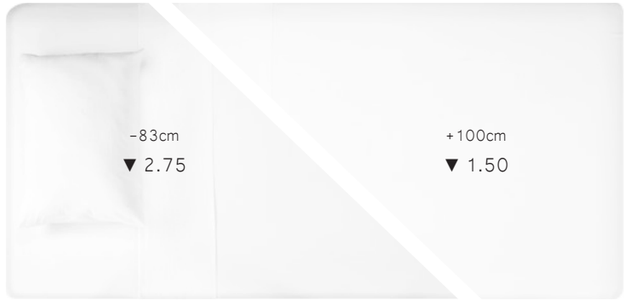
The same transformation can also be performed on the other side creating a second separated bedroom. The ceiling height in the center of the room stays 3 meters. Any type of textile can serve as a privacy screen which can be lowered and pulled up by the mechanism of the platforms.

The privacy screens can extend over a second platform as well, so the partition provides more private space to undress and prepare oneself. The large storage underneath the concrete ceiling can be accessed from there.

Sleep 02 - Shared apartment

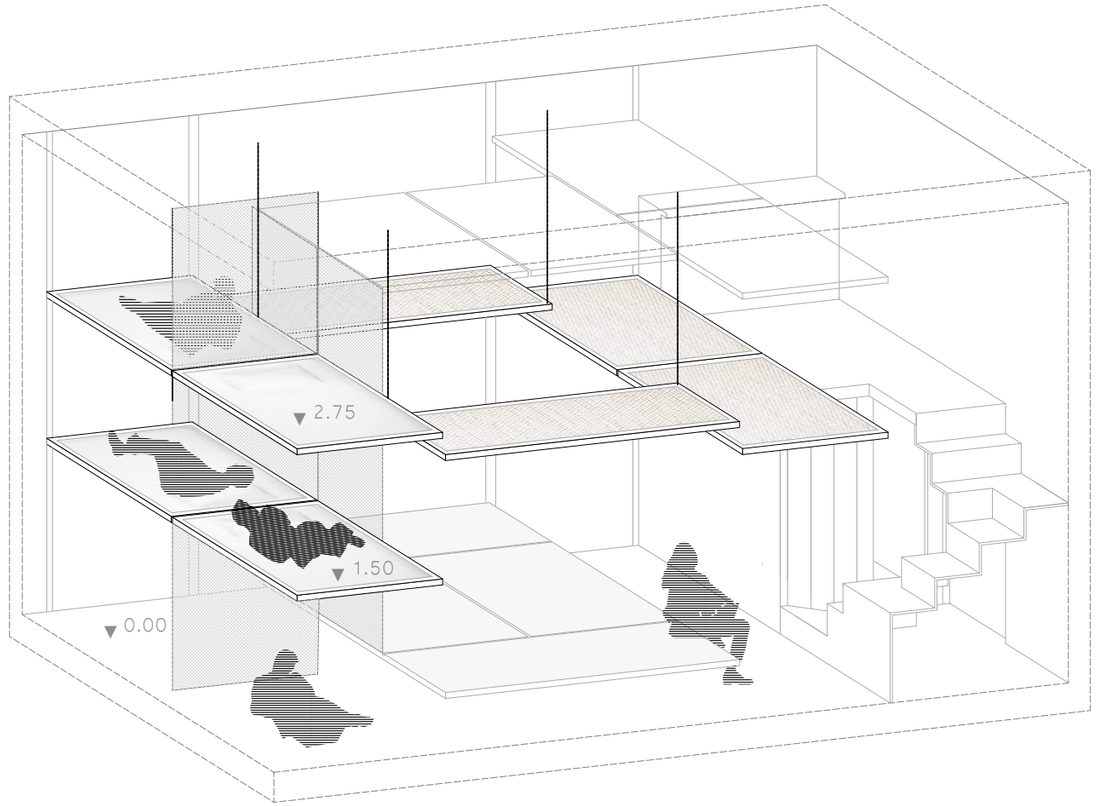






When the company gets big again this flat can provide up to 6 separate sleeping cabins on top of each other. Now the unit can also be used as a hostel. The small kitchen and the bathroom are unaffected by the change. If needed one of the platforms in the centre of the room can be pushed up as well to serve as a breakfast table or meeting spot.

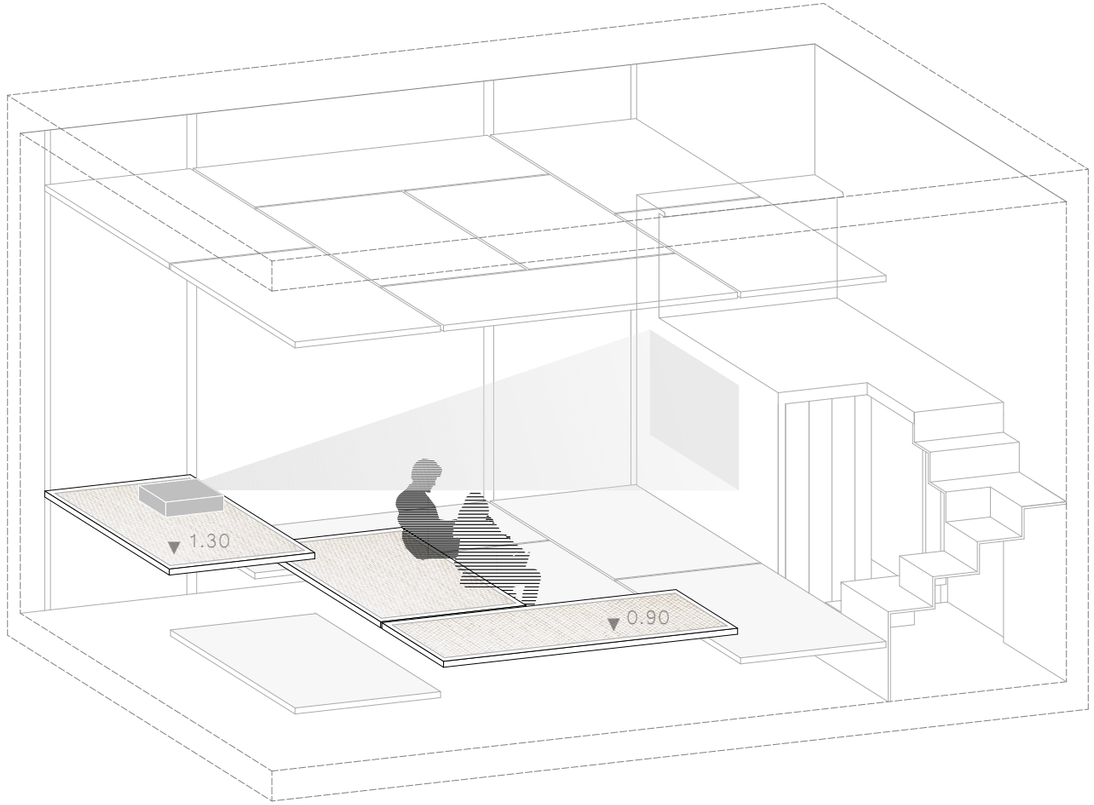
Sleep 03 - Hostel



Some platforms can be raised to act as a bench to sit on. When desired pillows and futons can be taken from the storage underneath.

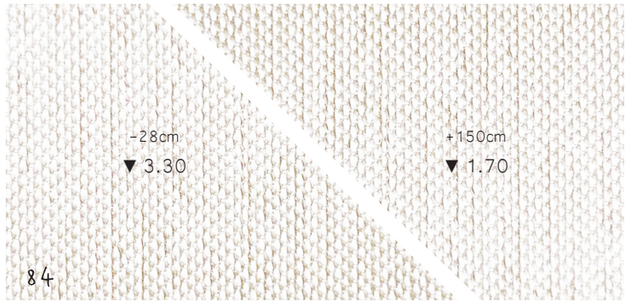
The bathroom wall can serve as a screen to project onto with a beamer.

Watch 01 - Living Room

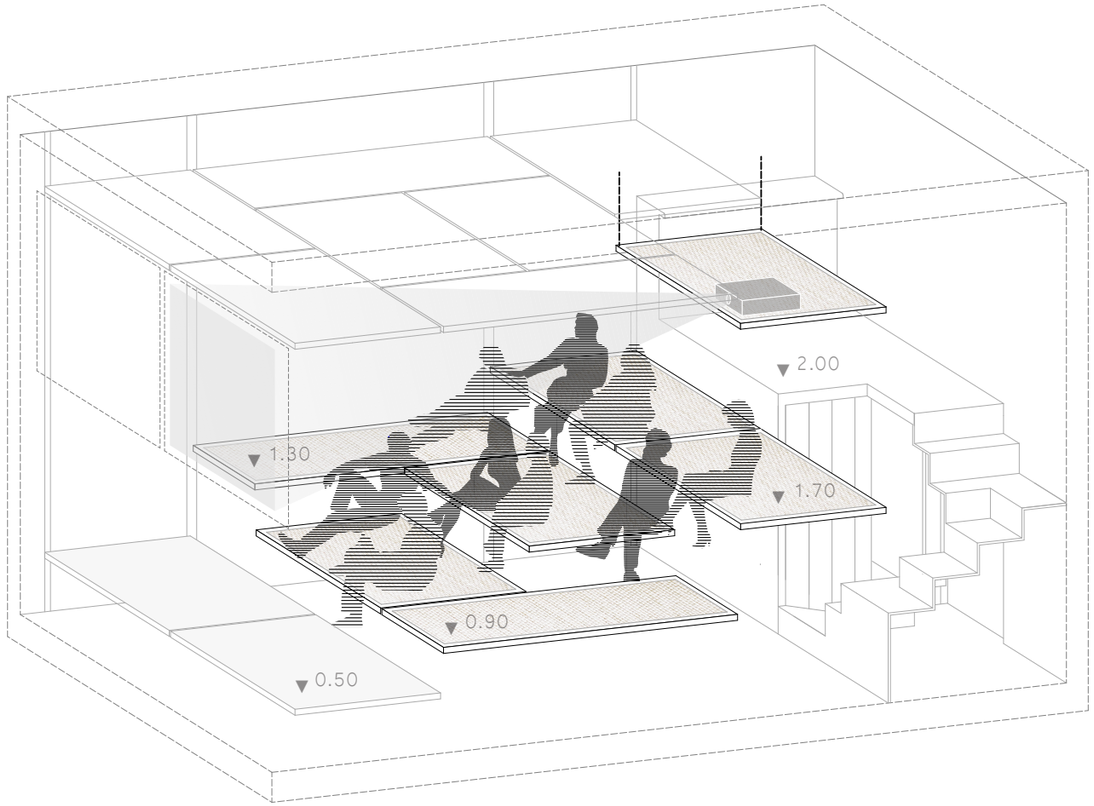


A beamer can be store overheads and suspended to project on the sun protection.

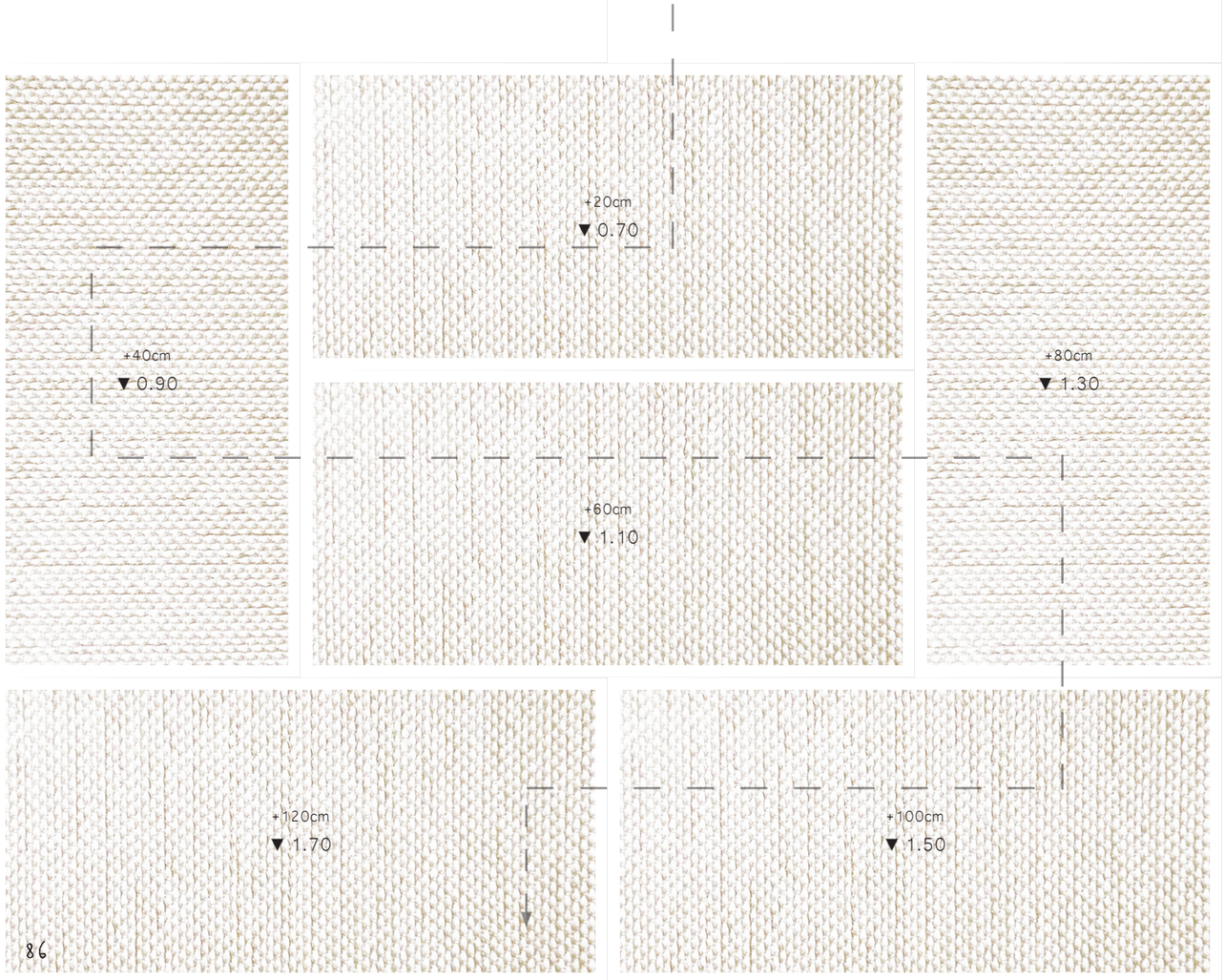
The platforms form a kind of arena with the stairs differing in 40 cm height to each other. So it can be sat upon and they also can be used as a staircase to go up to the kitchen.

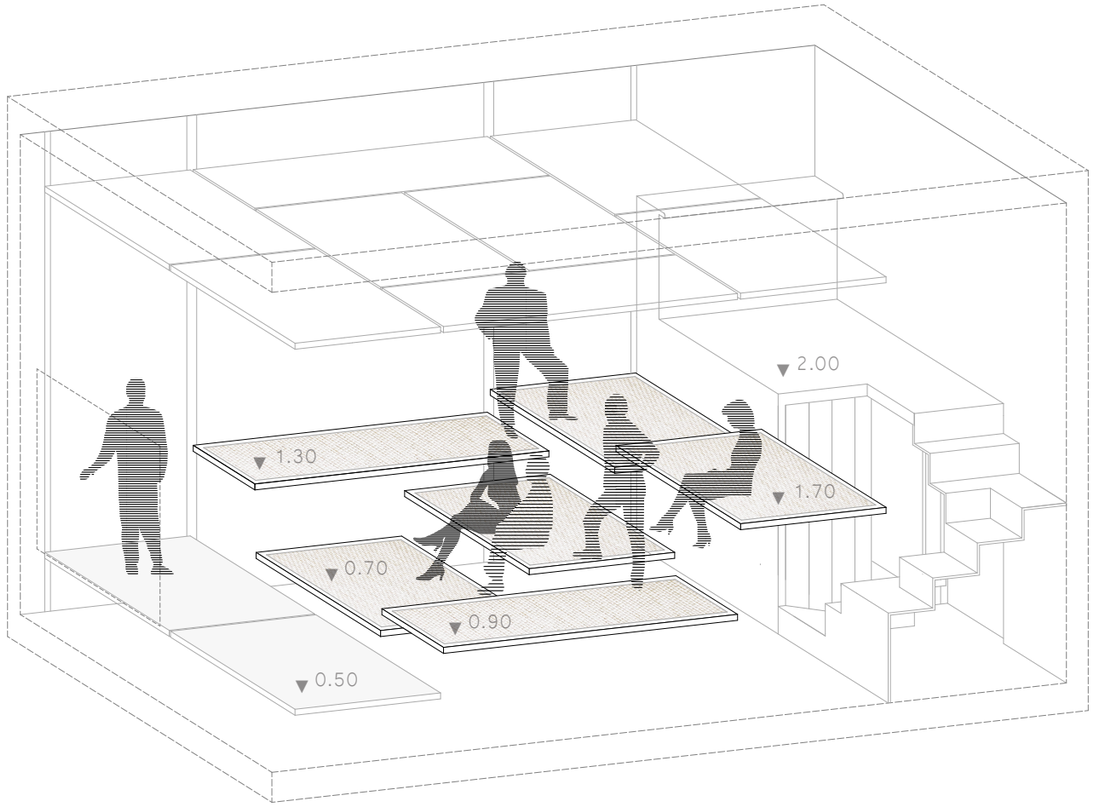


Watch 02 - Cinema



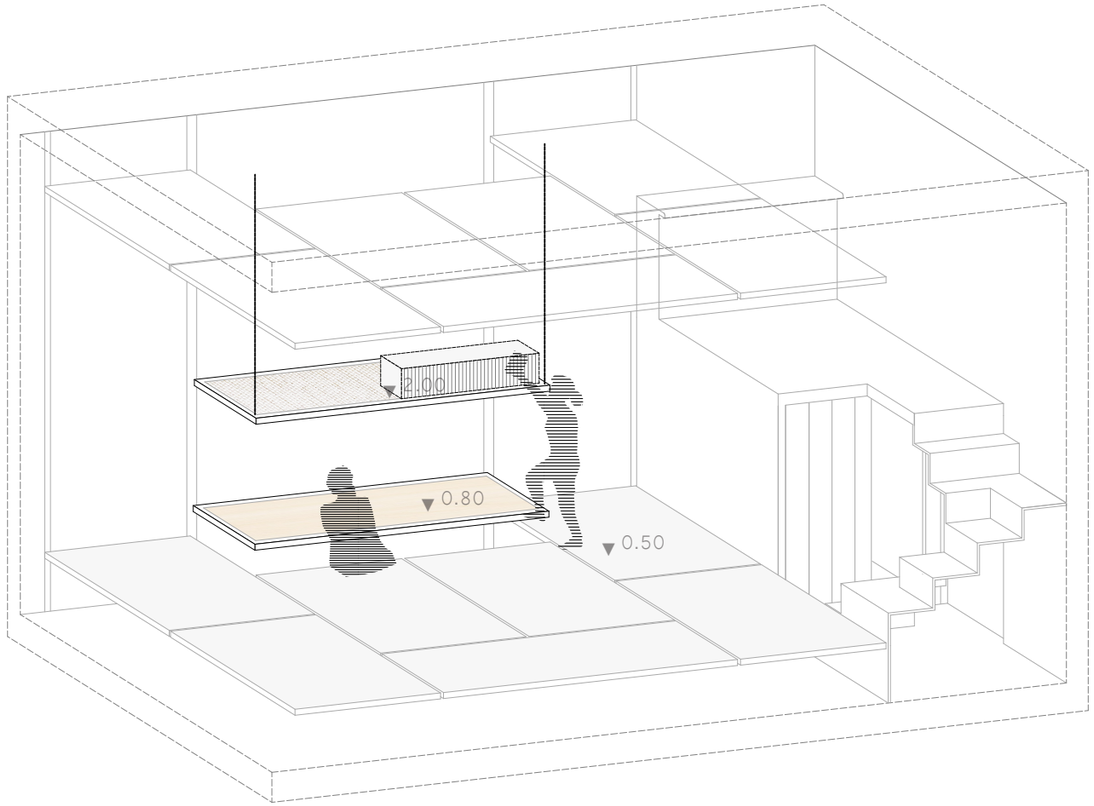
Another version of the arena with the platforms differing in various heights. But now a pass way between kitchen and the lowest platforms is established making it possible to walk down and up more comfortably.





The suspended platforms can feature permanent storage so they act as a shelf in case the user is working from home.

Lights are built into the frames of the top layer of platforms and therefore can be adjusted to a certain need and height. Electric ports are to be found inside the frames of the lower set of platforms.



+30cm
▼ 0.80

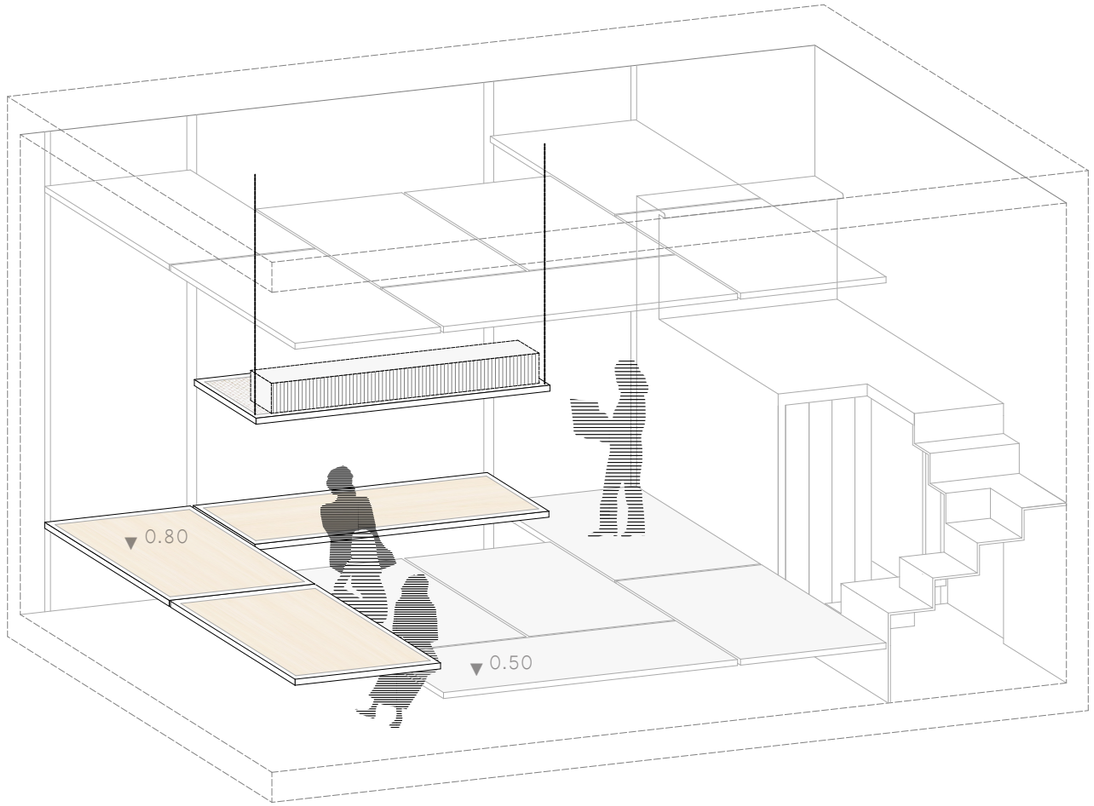
+30cm
▼ 0.80

This table can be extended giving more space for more workers. Again the boards can be flipped to reveal the wooden side which is a better fitting material to work on. A small studio can fit into this place.

-158cm
▼ 2.00

+30cm
▼ 0.80

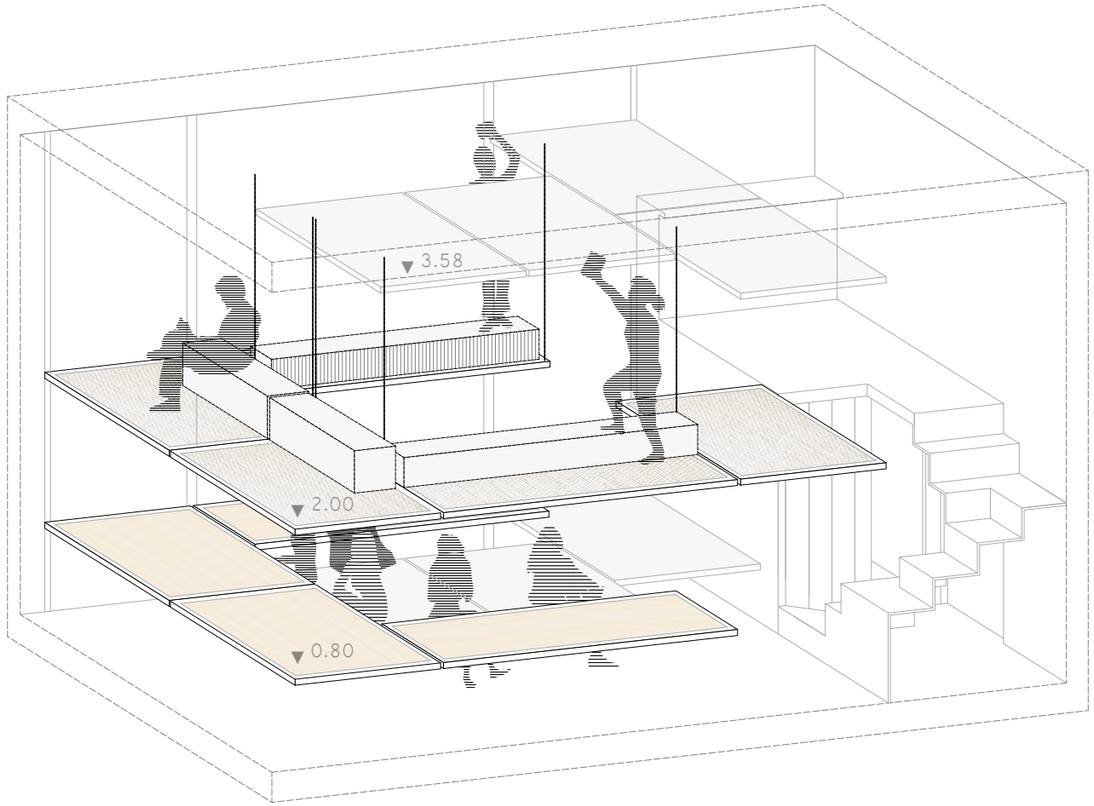
Work 02 - Home Office



The maximum space utilisation is a 2 story library and a big working space for a bigger atelier.

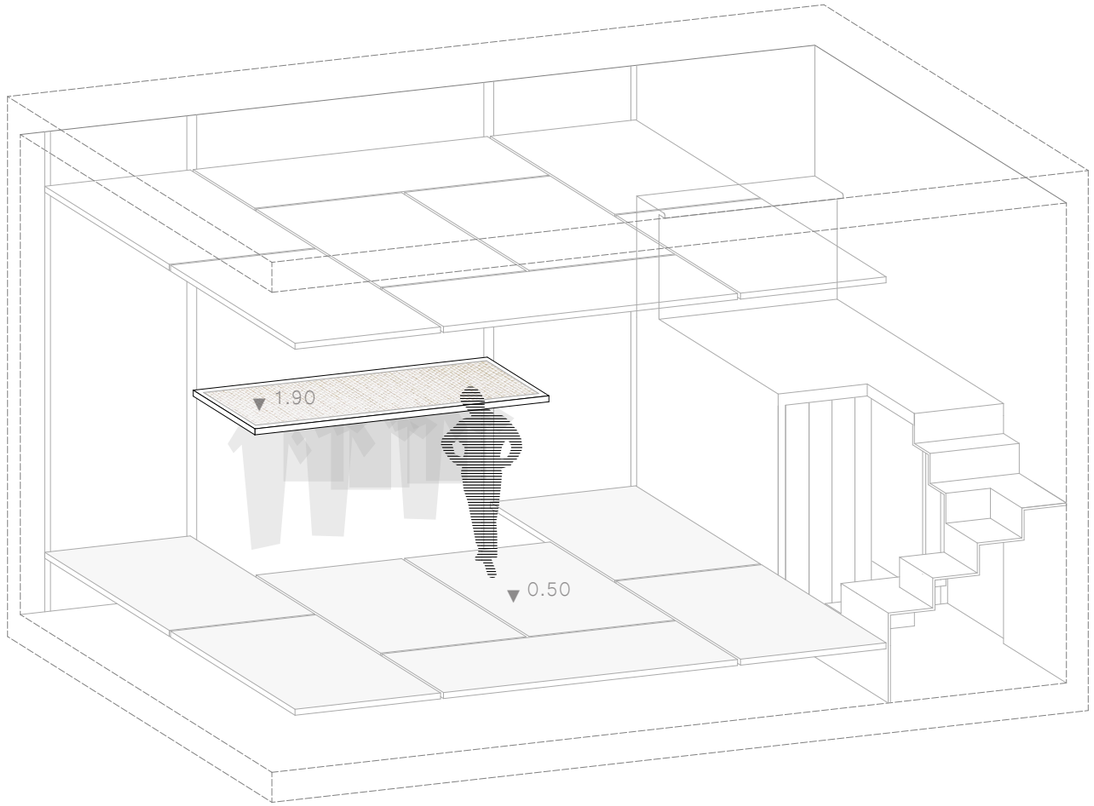
All the storage places are now available and easily accessible.

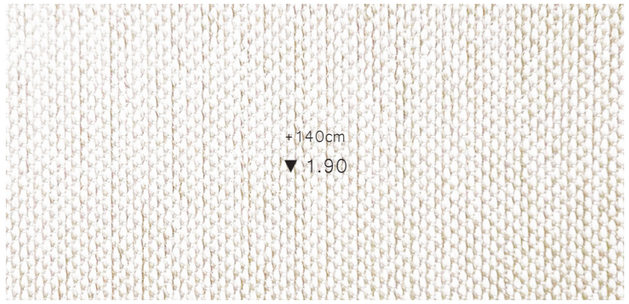
Work 03 - Office & Library

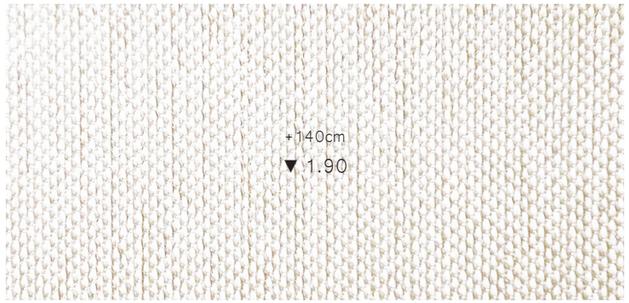


Underneath the bottom platforms it is convenient to store goods. Furthermore it does not bother the rooms' appearance if there are clothes rails or drawers fixed on the underside. In that way a customised wardrobe can be driven up with all the clothes already in place. When going down long pieces of clothing can fold into textile pockets positioned on the concrete floor.

Dress 01 - Wardrobe

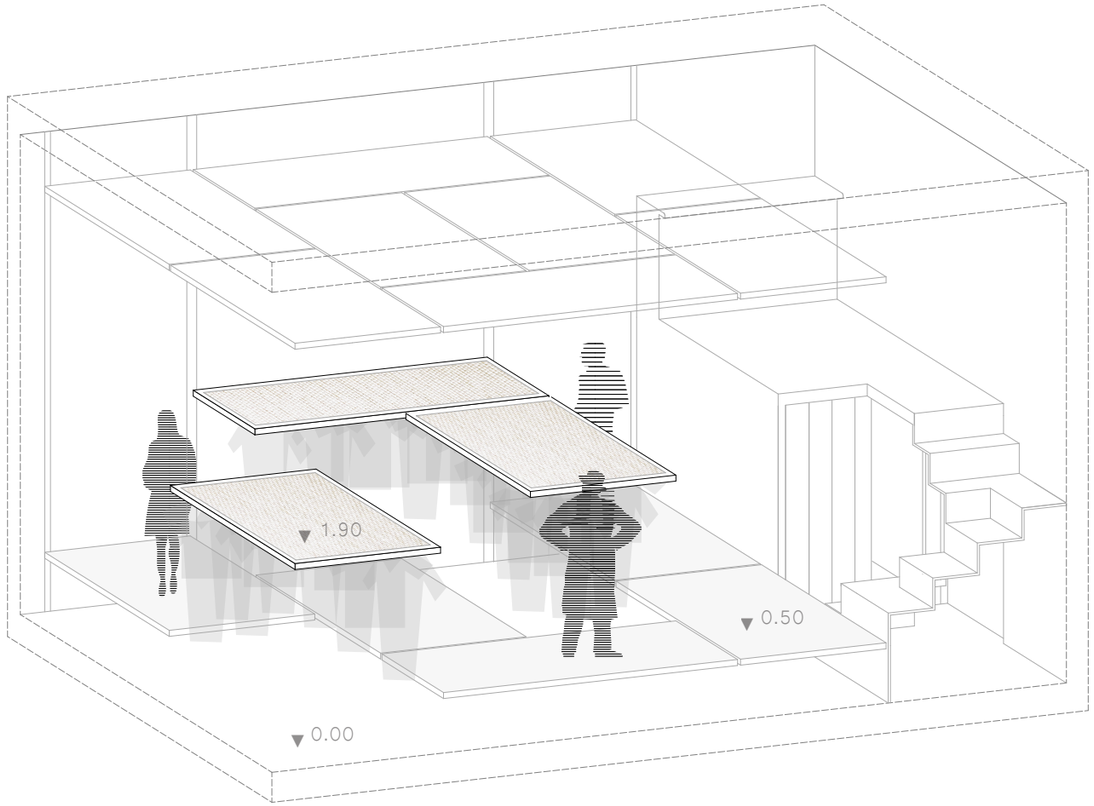






When using the same principle for several platforms it can create a small clothing shop. The additional space on top of the moved platforms may be used to showcase other utensils as shoes or hats for example.

Dress 02 - Small Fashion Shop



-148cm
▼ 2.10

+140cm
▼ 1.90

-148cm
▼ 2.10

+140cm
▼ 1.90

+140cm
▼ 1.90

-148cm
▼ 2.10

To utilise the maximum a two-story boutique can fit into this space. Two stacked roundabouts let the costumer see a maximum number of clothing. The kitchen can serve as a cash desk as well. The bathroom can be converted into a changing room. The space left in between the lower and the upper platforms is additional storage space.

-148cm
▼ 2.10

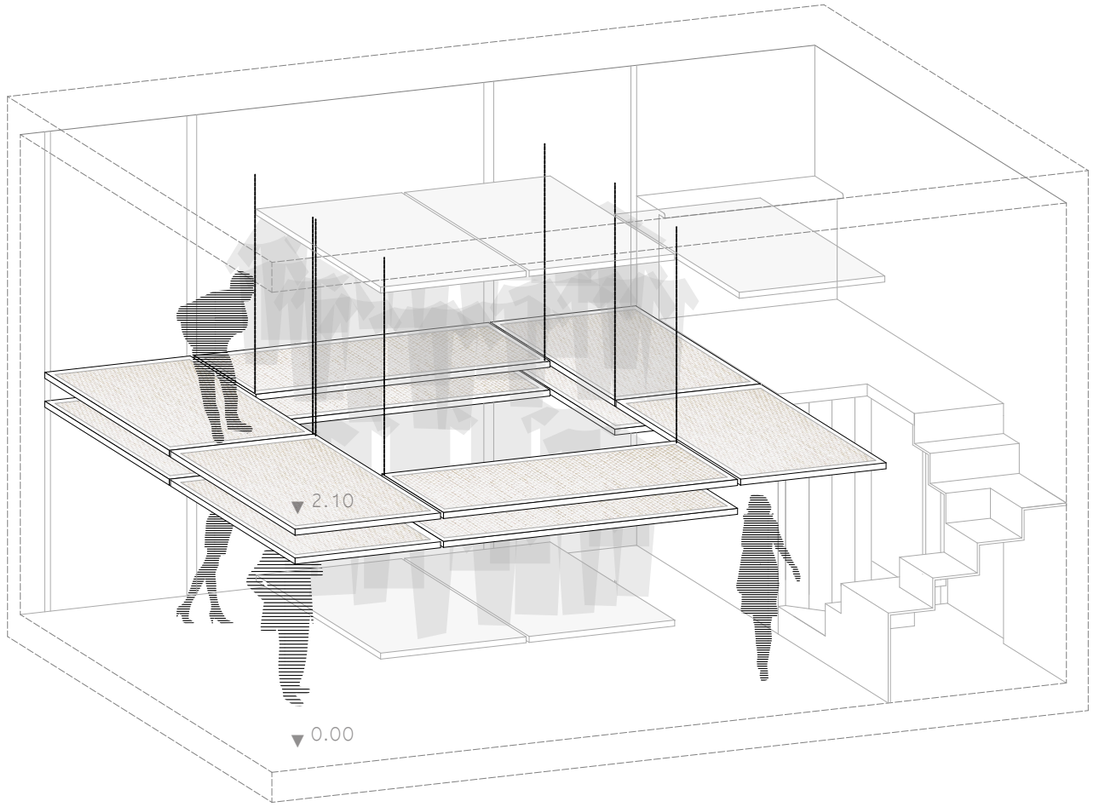
+140cm
▼ 1.90

+160cm
▼ 2.10

+140cm
▼ 1.90

-148cm
▼ 2.10

Dress 03 - Two-Story Boutique



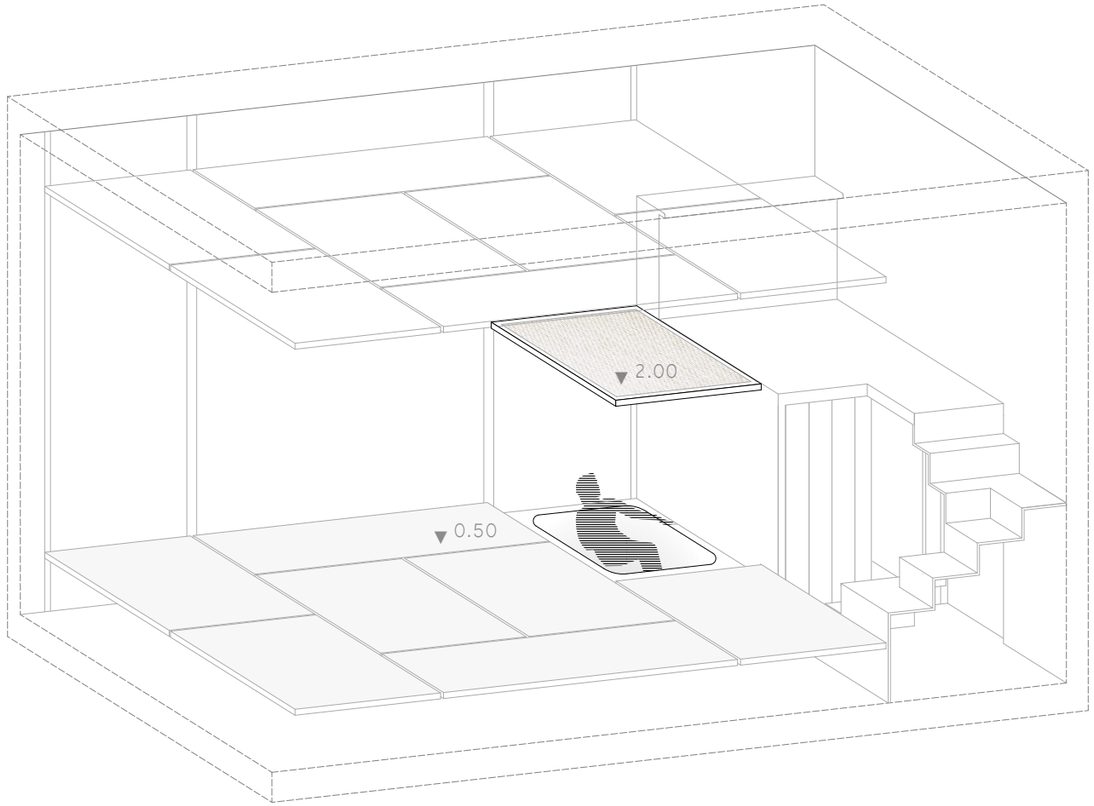
The bathroom is held quite small, for the simple reason that we do not spend too much time of our day inside it.

For the bathtub there is a different situation because people usually want to spend more time bathing.

Sharing the water supply with the bathroom situated in the bathroom wall it is possible to take a bath outside enjoying plenty of light and space.

For this use it is important to have water resist-ant material for the flooring system. Underneath the shifted platform there can be a TV or other gadgets to distract one's mind while taking a bath.

Relax 01 - Bathtub



+40cm
▼ 0.90

+40cm
▼ 0.90

+40cm
▼ 0.90

In case of people getting together the room can adjust and the guests can sit in a circle having the centre of the room empty.

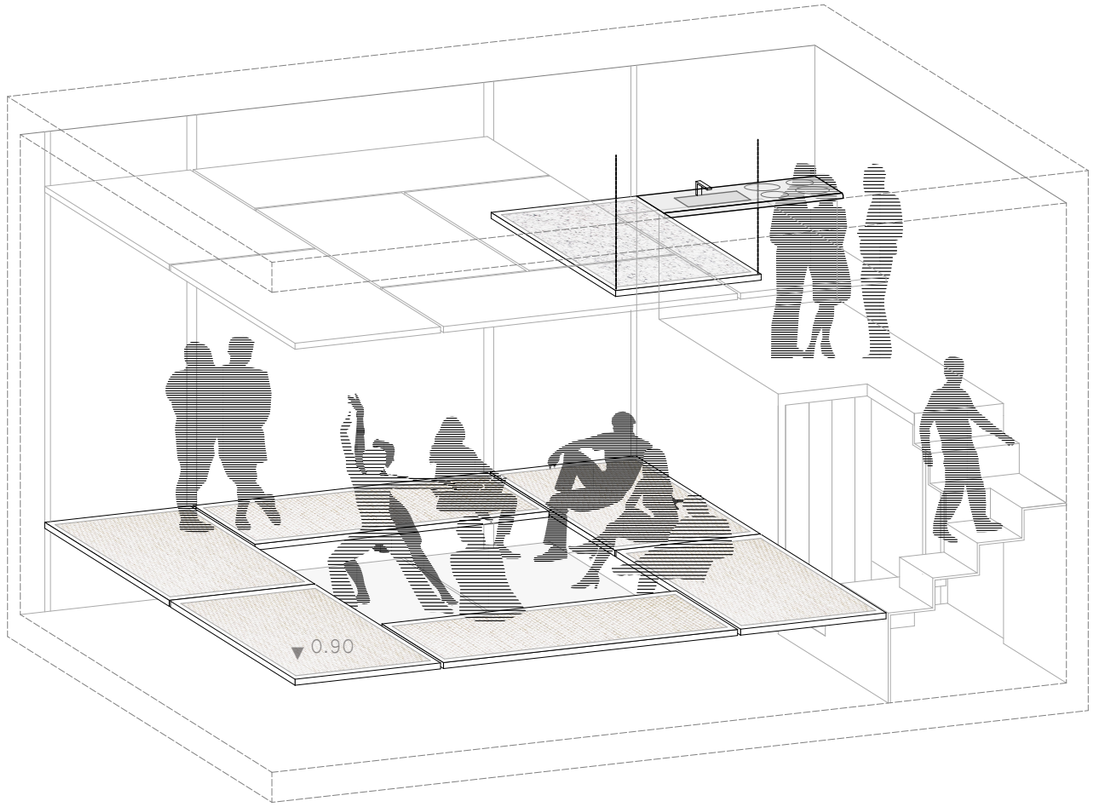
+40cm
▼ 0.90

+40cm
▼ 0.90

+40cm
▼ 0.90

−68cm
▼ 2.90

Relax 02 - Party



+50cm
▼ 1.00

-83cm
▼ 2.75

+75cm
▼ 1.25

-58cm
▼ 3.00

-108cm
▼ 2.50

+25cm
▼ 0.75

The user manual of how to use this room has uncountable options adjusted to different uses. Many of the options shown before can be combined or changed.

It can however also form spaces which do not necessarily follow a specific reason. In this case a helix is going through all the space making all spaces accessible.

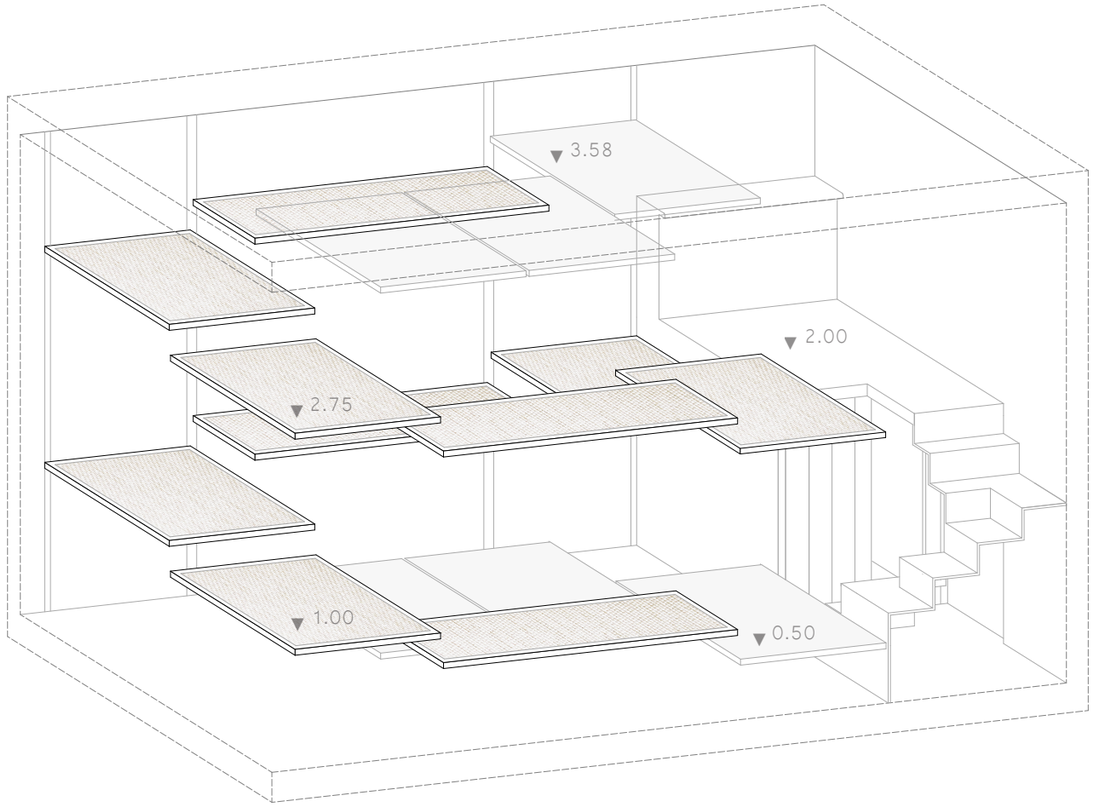
+100cm
▼ 1.50

-33cm
▼ 3.25

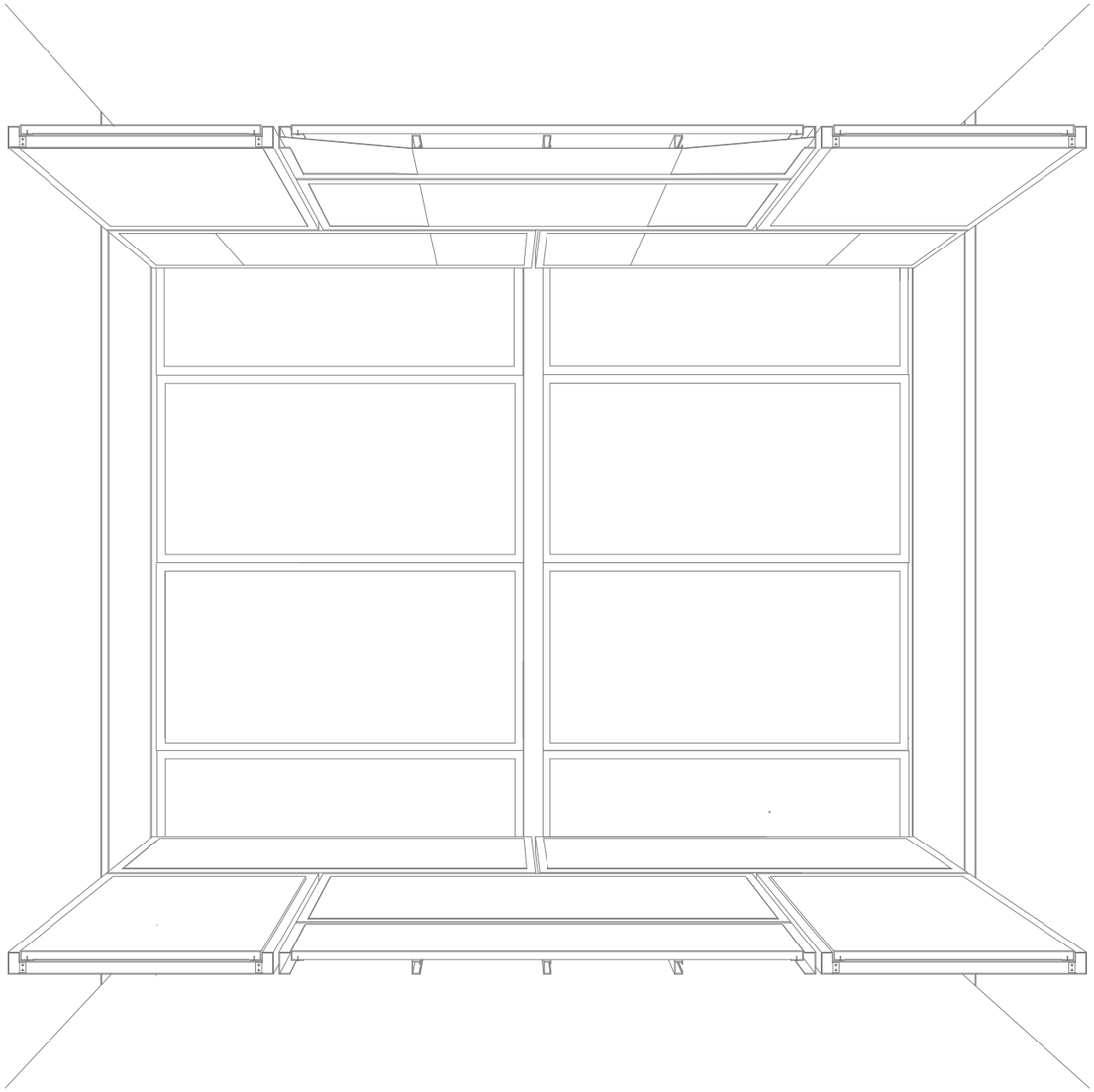
-133cm
▼ 2.25

+125cm
▼ 1.75

Other - Helix



Detail



Personal note

During my time studying at Shibaura Institute of Technology in Tokyo I was lucky enough to meet the famous Jun Sato, one of the leading Japanese structural engineers at the time. My professor Yoko Ito, who knew him from a completed project, gave me his private email address and asked me to send my concept.

Soon he responded to invite me to his studio at Tokyo University where he took his time to help me think of a structural concept and in the end gave me exact dimensions and materials to turn my ideas into a viable structure. Concluding our extended conversation he signed off on the project by saying the words “now this really works”.

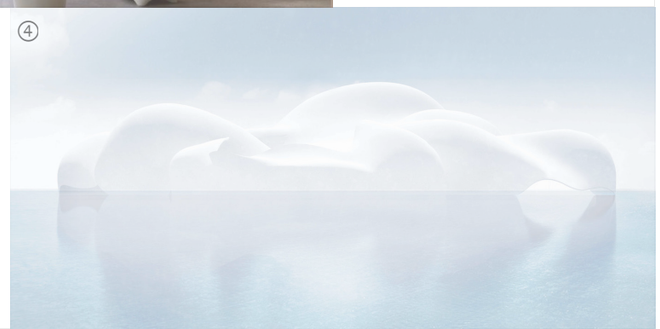
2017. 1. 15. Emi.


①


②


③

Images
① Jun Sato at his workshop at Tokyo University, photo by Maggie Janik, 2017
② House NA, Tokyo, Iwan Baan Photography, 2011
③ GC Prostho Museum Research Center, photo by Daici Ano, 2011
④ Junya Ishigami, rendering for World Peace Pavilion, Copenhagen, 2014


④

Jun Sato

Jun Sato Structural Engineers Co. Ltd.

Jun Sato graduated from the Faculty of Engineering at Tokyo University's architecture department. Upon graduating from the University of Tokyo, he began working under the guidance of the esteemed Toshihiko Kimura, one of the most notable Japanese engineers of the 20th century, who worked with greats such as Fumihiko Maki and Tadao Ando. He worked at Toshihiko Kimura's engineering office from 1995 to 1999. In 2000 he established Juan Sato Structural Engineers Co., Ltd. where he continues to hold the position as the Chief Executive Engineer. Awards and recognition soon followed, including the Japan Structural Engineer Award in 2009. He received his Doctorate of Engineering at the University of Tokyo in 2013 and is now an Associate Professor at University of Tokyo as well as a Visiting Professor at Stanford University in the US.

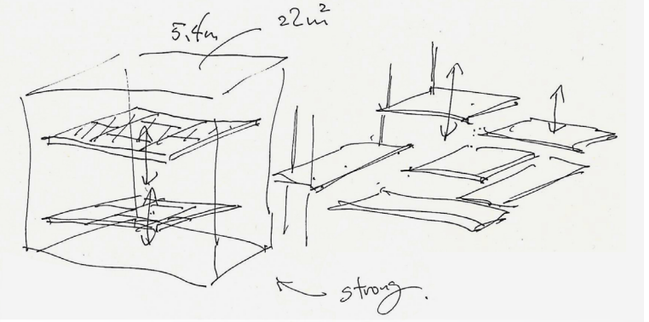
The engineering office first got recognition by collaborating with Kengo Kuma on several projects. The first notable project that emerged from their partnering was the new Museum and Research for the GC Prosthetic company in Nagoya. (Image ③)

Furthermore he closely worked with Sou Fujimoto and amongst other projects made the famous "House NA" possible, which was published countless times in international newspapers and magazines. (Image ②)

Most recently he participated in Junya Ishigamis competition winning design for the World Peace Pavilion in Copenhagen. (Image ④)

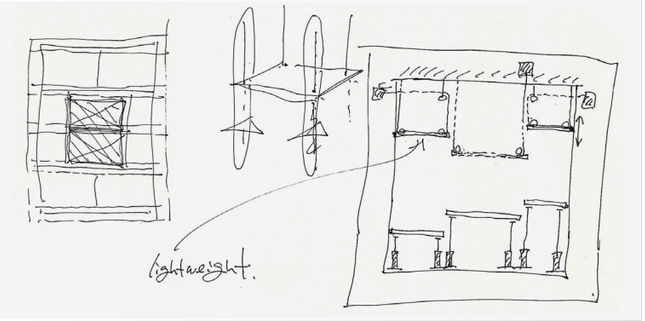
Jun Sato can also name collaborations with Toyo Ito and Riken Yamamoto.

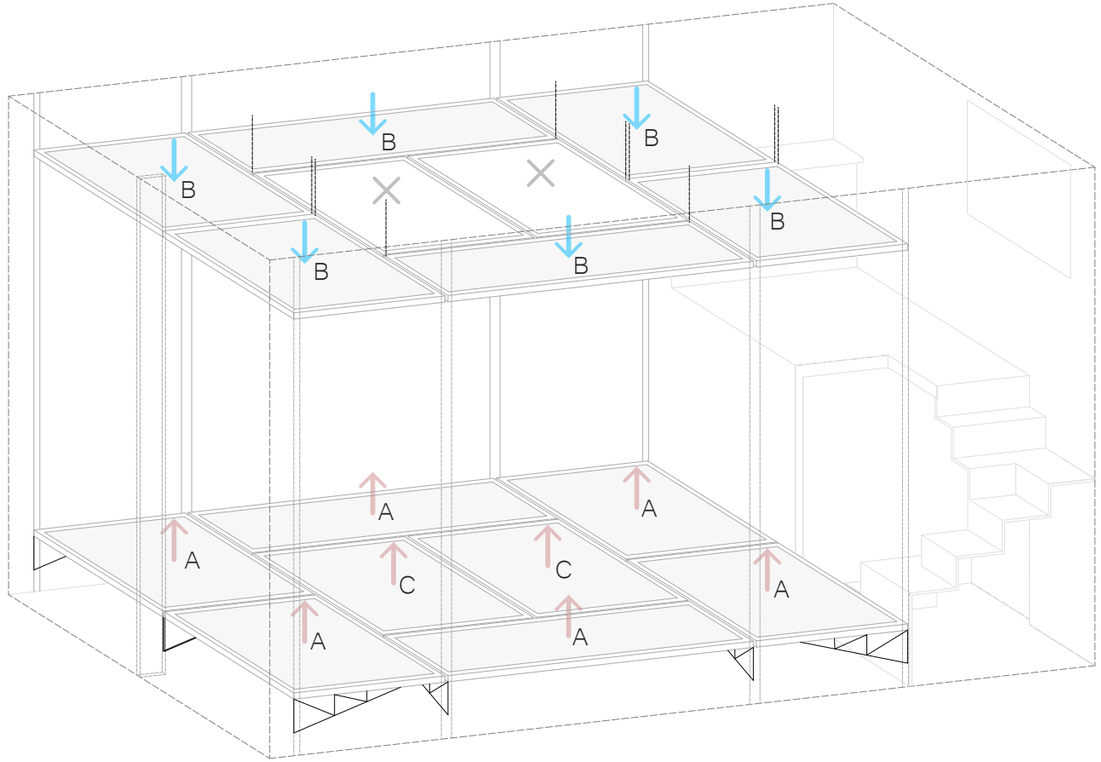
His sketches for my project are shown on the following pages.



Apart from the 2 unmarked platforms on top all the remaining ones can move. There has to be distinguished between 3 different types; Type A which consists of the lower platforms situated next to the concrete walls; Type B, the platforms hanging from the concrete ceiling and a special Type C, the 2 platforms on the bottom in the centre of the room.

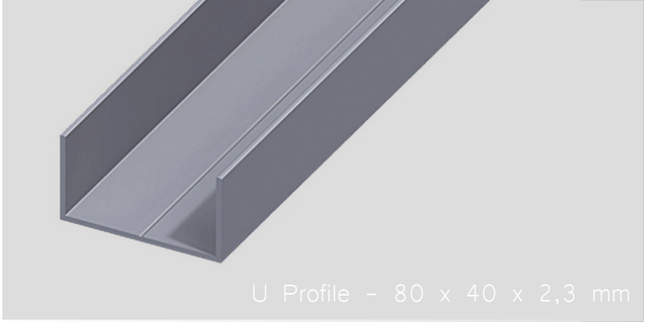
Type A & B use rails which are inserted vertically into the concrete walls to move up and down in a controlled, stable manner. Type C does not have this option, which is why here a special system had to be found. All the details and how to construct those different Tatami platforms are demonstrated on the following pages, step by step.





Step 1

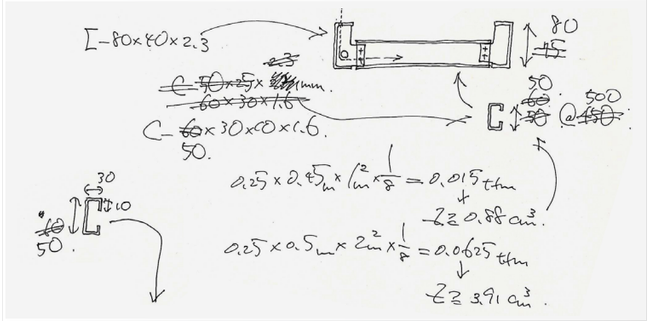
The basic frame is constructed of 4 U-Profiles in stainless steel. The minimal dimensions were calculated to measure 80 mm in height and 40 mm in width with a thickness of 2,3 mm.

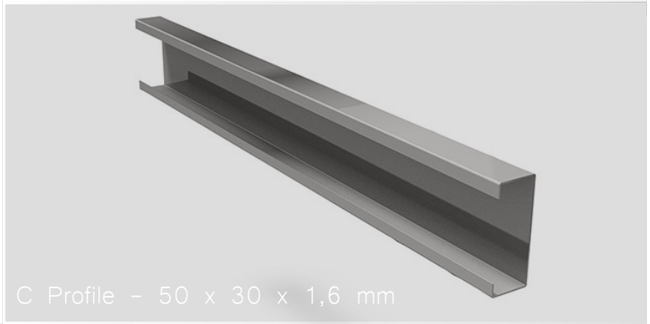


U Profile - 80 x 40 x 2,3 mm

Step 2

To distribute the anticipated load 3 C-Profiles are fixed across the length of the framework. The load used to calculate these dimension is equal to the required building standards in Japan.





C Profile - 50 x 30 x 1,6 mm

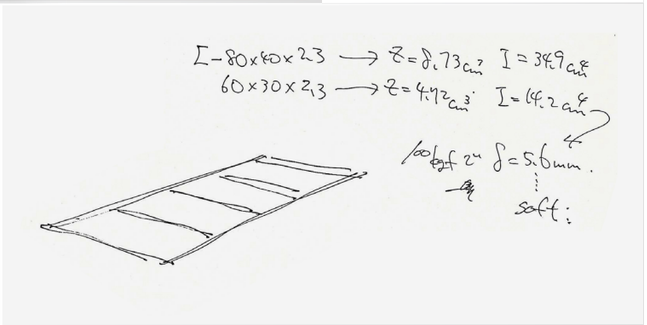
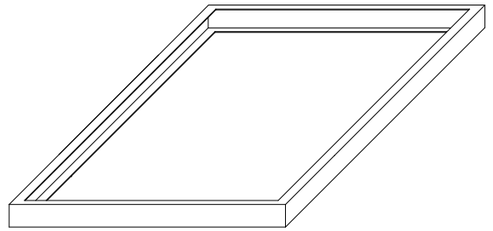
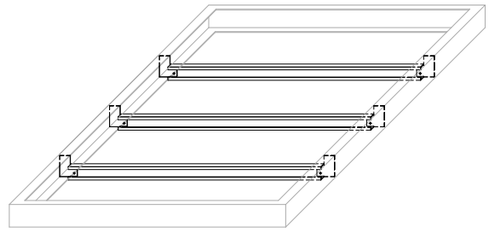


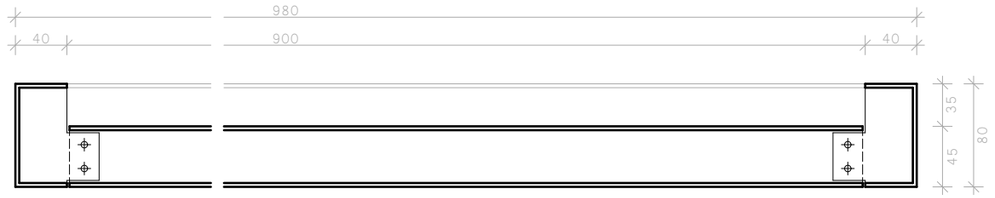
Image U-Profile: bauhaus.info/metallprofile-kunststoffprofile/kantoflex-rechteck-u-profil/p/10522186
Image C-Profile: hekimprofile.com/c-profile

Step 1



Step 2





1:5

Step 3

Next up is the preparation for the Tatami like panels. A 30 mm thick Plywood board serves as a stable surface. By covering one side with woven PVC, which is more durable than a traditional Tatami mat and water-resistant, the platform reminds of its predecessor.

Woven PVC - beige

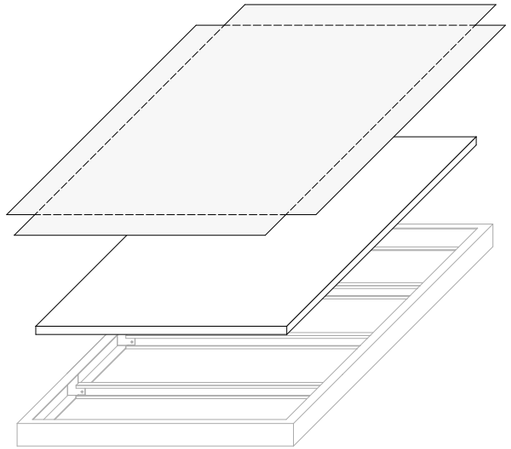
Step 4

The finished panel now fits seamlessly into the steel framework and can easily be replaced or flipped over to allow different uses. This allows the user to change not only the appearance but also the materiality and texture if desired.

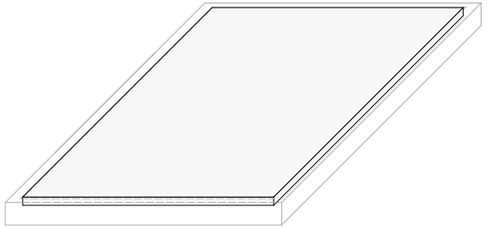
Plywood Board 30 mm thickness

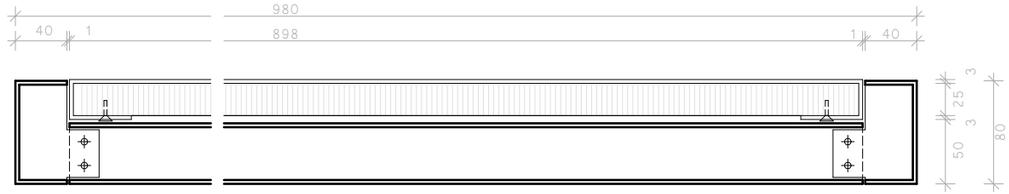
Image Woven PVC: zetafloors.com/product/ZTFLOOR-ZT9-6-Woven-Grain-PVC-Flooring.html
Image Plywood Board: sveza.com/de/products/sveza_gasno96

Step 3



Step 4





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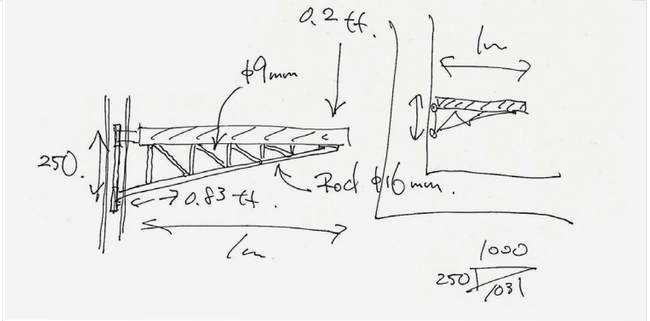
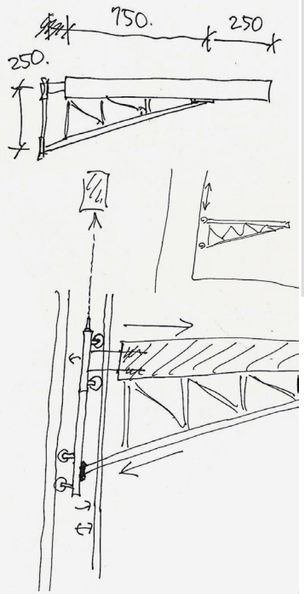
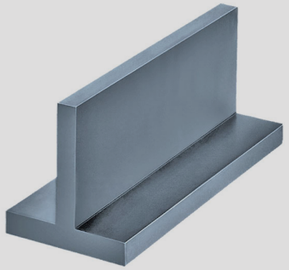
Step 5A

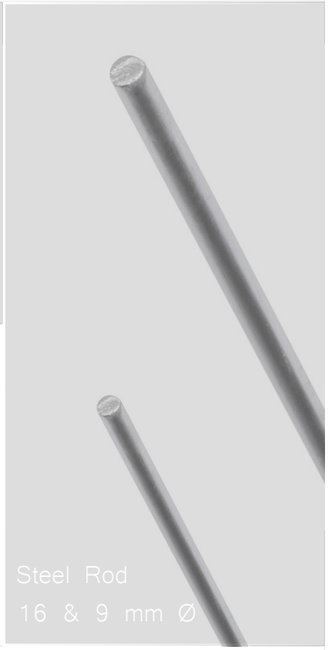
Now the manufacturing process depends on the type of platform. For the bottom platforms situated at the walls cantilevers made from steel rods and a T-Profile are attached. This support can bear weights comparable to the requirements of a general residential floor now.







T Profile - 50 x 50 x 6 mm



Steel Rod
16 & 9 mm Ø

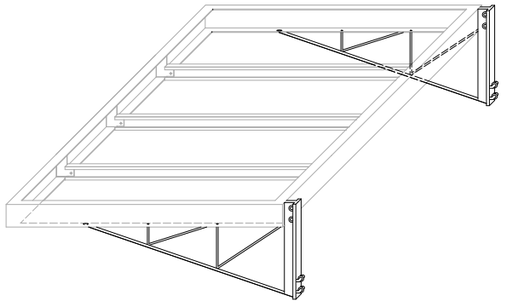
Step 6A

Finally a 5 mm thick steel cable is installed and together with the T-Profile they are hidden inside the rail inserted vertically into the concrete wall. A simple motor is now able to pull the platforms up and let them down gently. Small wheels help to keep the structure in shape.

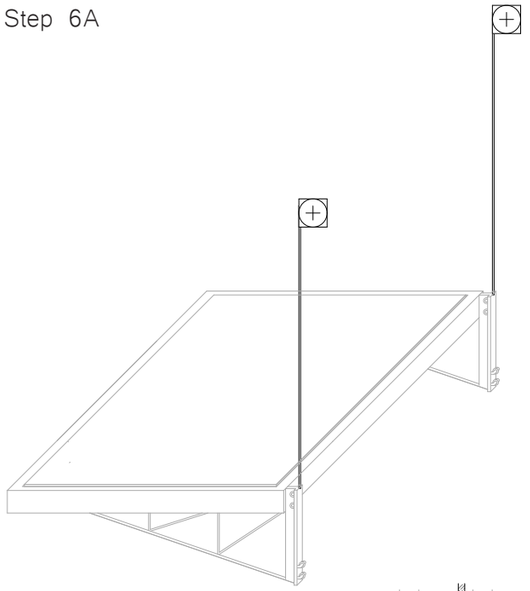
Steel Cable - 5 mm Ø

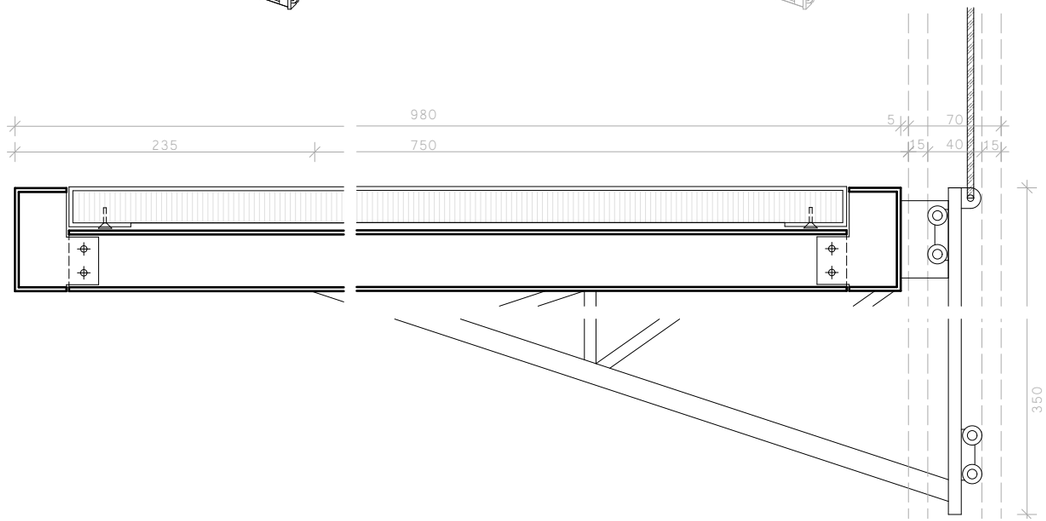
Image T-Profile: ramseier-normteile.at/shop/product_info.php?products_id=245176
Image Steel Rod: bunnings.com.au/metal-mate-10mm-x-1m-galvanised-steel-round-solid_p1130453
Image Steel Cable: vetio17.fr/category/cables/page/8/

Step 5A



Step 6A





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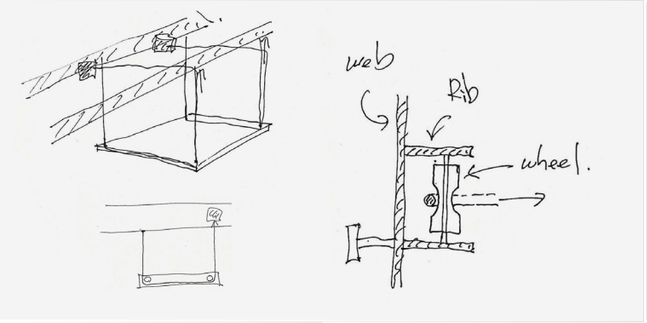
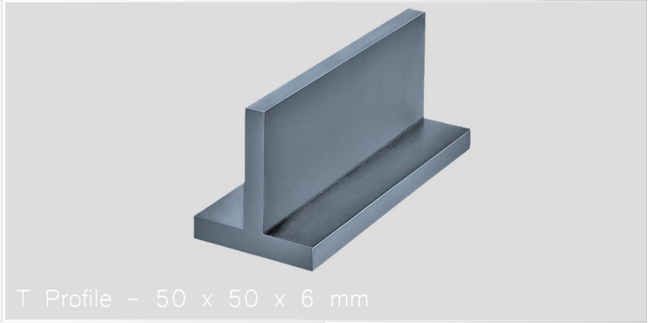
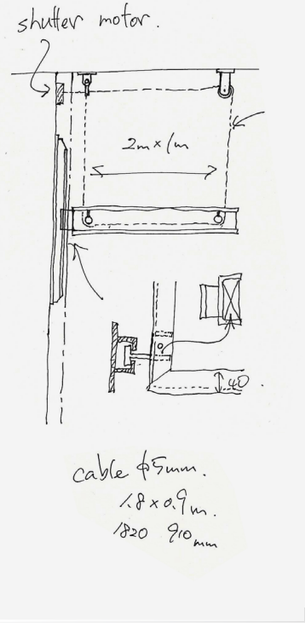




T Profile - 50 x 50 x 6 mm

Step 5B

For the platforms hanging from the ceiling a different approach is taken. First another T-Profile is attached to move up and down inside the rail. Then holes are made into the frame and an interior pulley is installed.



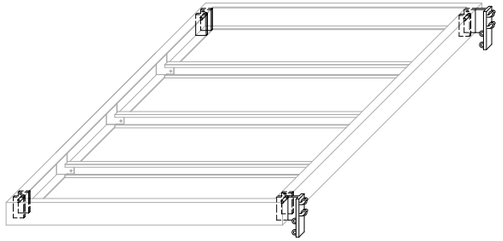
Steel Cable - 5 mm Ø

Step 6B

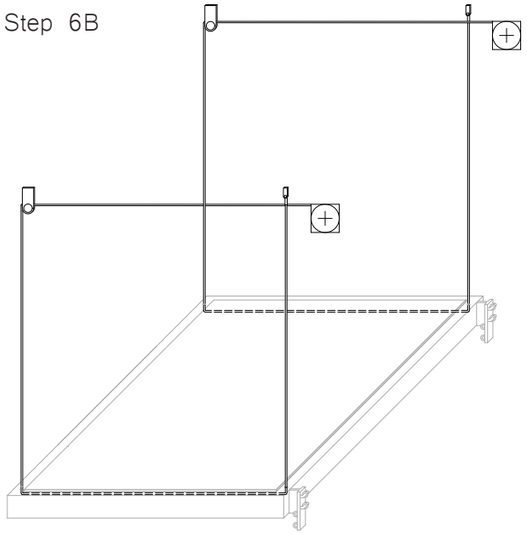
The 5 mm thick steel cable can now go through the platform. All 4 corners are supported by the cables.

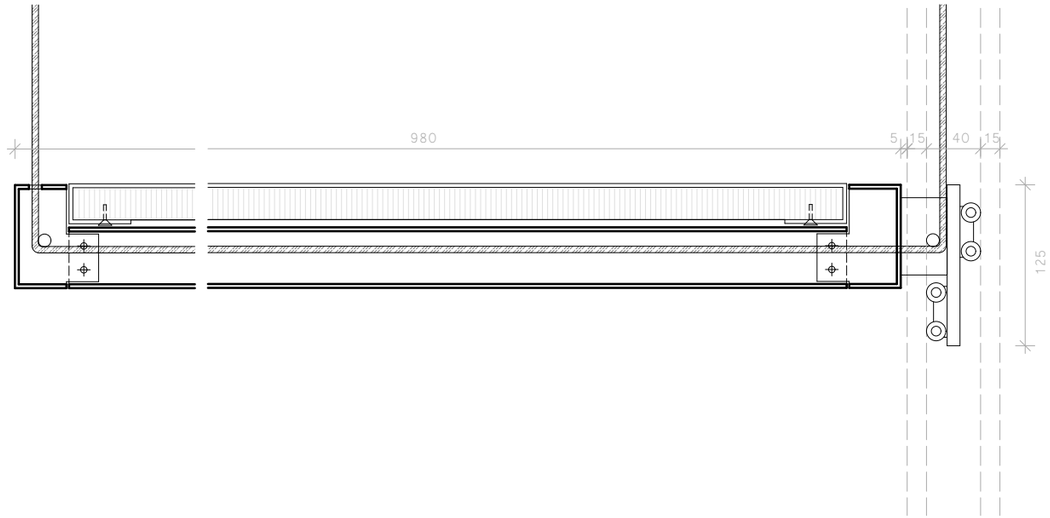
Image T-Profile: ramseier-normteile.at/shop/product_info.php?products_id=245176
Image Steel Cable: vetio17.fr/category/cables/page/8/

Step 5B



Step 6B





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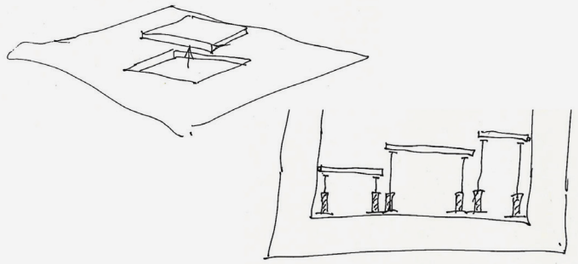
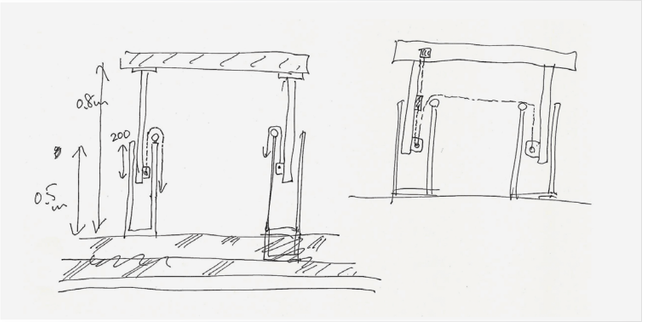


Hydraulic Cylinder



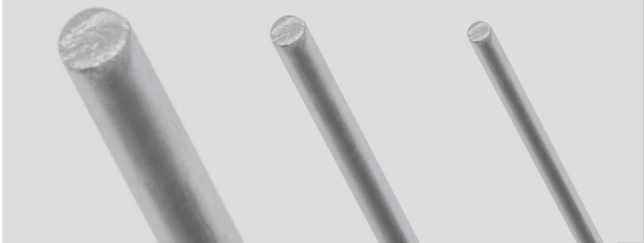
Step 6C

Those feet go inside a double acting hydraulic cylinder to allow smooth movements in space. Another possibility suggested by Jun Sato, to continue with the same mechanics is to fix a motor on the downside of the panel and to use a steel cable based system as shown in the sketches.

Step 5C

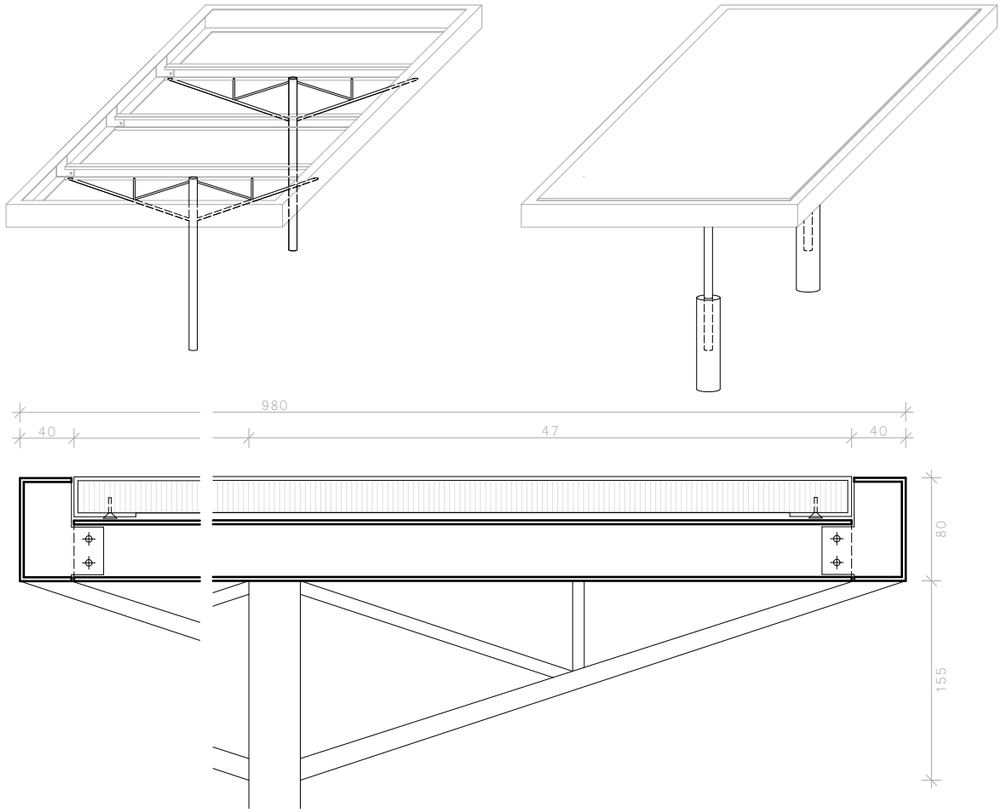
Similar to platform type A a cantilever, now double-sided, is installed, using the same steel rod dimensions as the previous. The cantilevers are joined with 40 mm thick steel rods which serve as feet on which the platform can climb up and down.

Steel Rod - 40, 16 & 9 mm Ø



Step 5C

Step 6C



/:5

Image Steel Rod: bunnings.com.au/metal-mate-10mm-x-1m-galvanised-steel-round-solid_p1130453
Image Hydraulic Cylinder: faie.at/landtechnik/hydraulikprogramm/hy-zylinder-oberlenker-teles/hydraulikzylinder/hy-zylinder-doppeltwirkend/5001450/hydraulikzylinder-kolben-oe-k-80-mm-kolbenstange-oe-s-50-mm

Control System

Appropriate to contemporary technical standards the platforms are controlled through a mobile phone application. The application is very simple and can be handled with just three menu items. This app does not yet include the control of lights, the window panels, the sun protection, the AC and other technical elements but is merely designed for the movement of platforms.

Move Single Platform

The user can control every single platform on its own and let it move up or down by typing in a specific amount of centimetres. At a sign of the smallest resistance the system will stop and the moving platforms retreat.

Saved Scenarios

By pressing this icon a list of saved room scenarios will pop up. Here it is possible to save the current composition or access previous state of rooms. Some scenarios are already pre-stored inside the menu before moving in.

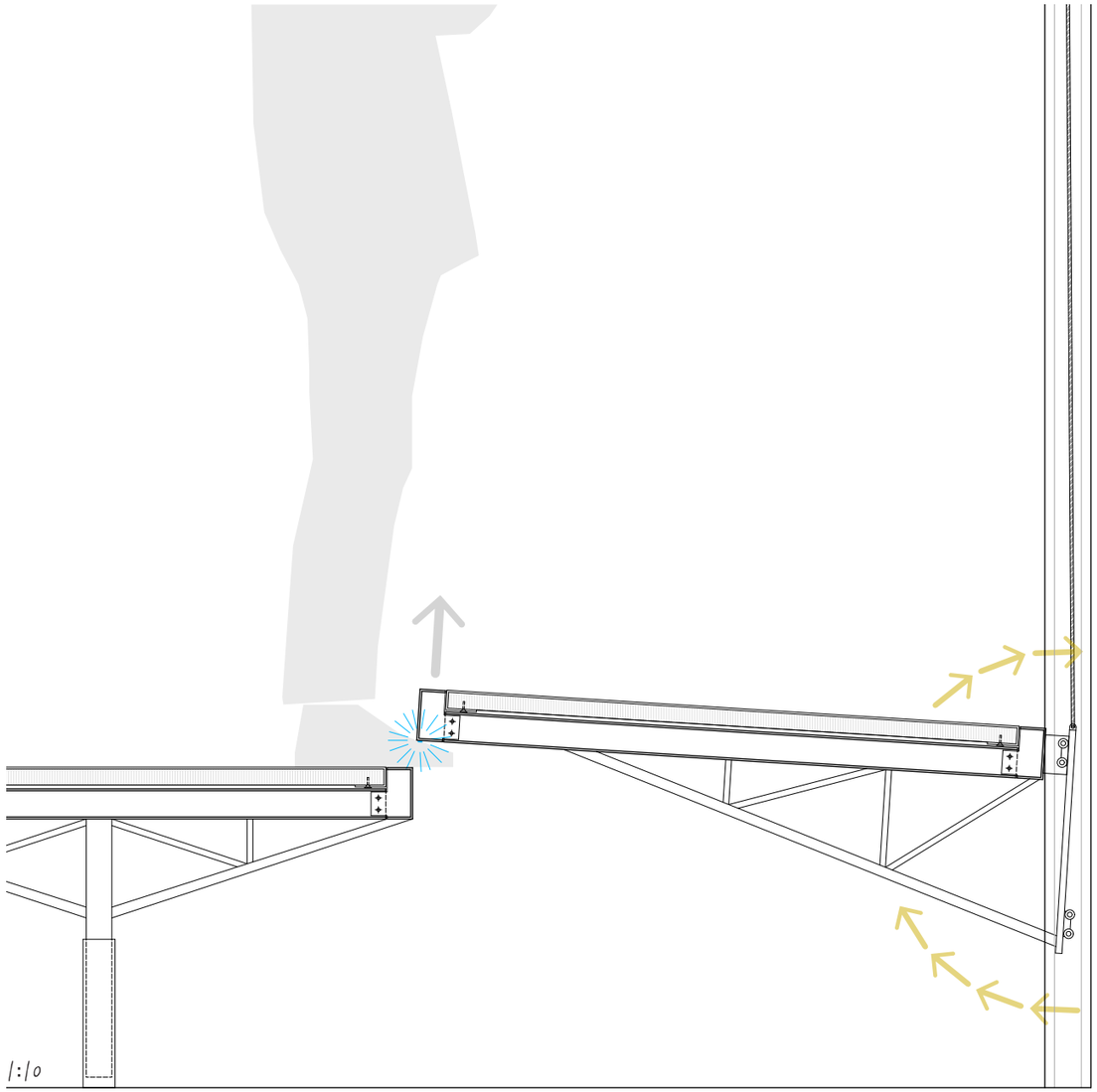
Options

At last there is the icon to access the configuration. It contains general data concerning the app and allows fine adjustments to the system and the way of using it.

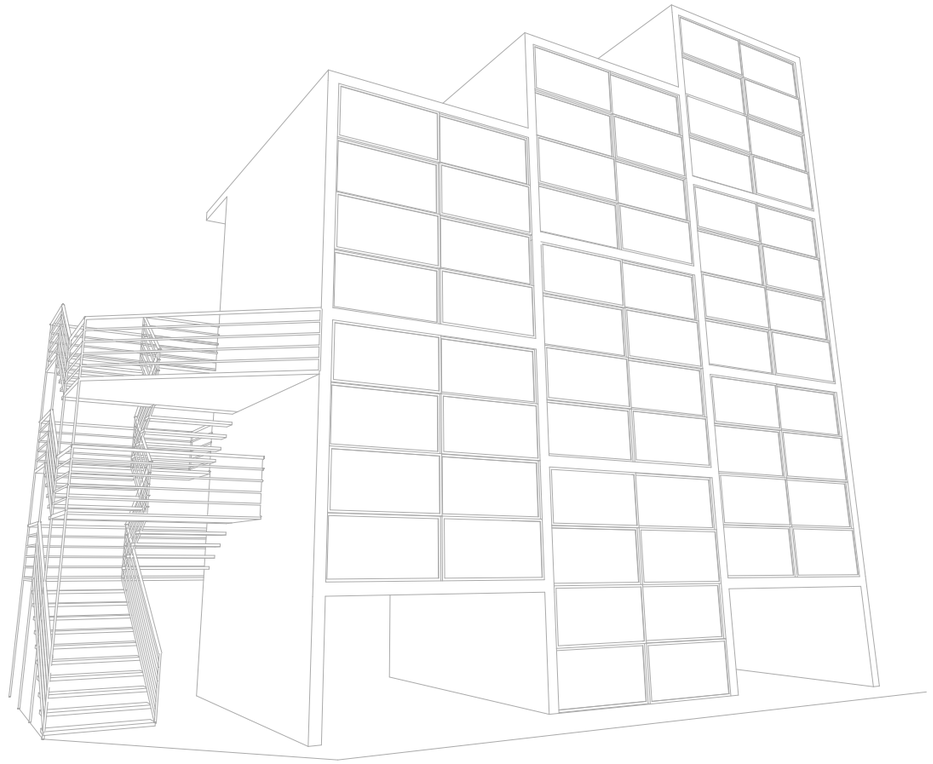
Safety Measures

A system involving heavy moveable parts can generate dangerous situations. Therefore it is crucial to consider proficient safety measures. As indicated on the right page 2 different precautions can occur. To guarantee highest safety standards there is a mechanical as well as an electronical safety measurement implemented.

A bearing play inside the rail allows for the platform to rise up. Wheels which make the platform go up and down more smoothly are adjusted to only one side respectively and therefore allow the platform to shift. Additionally a contact sensor underneath the frame causes the system to stop when triggered. This works in a similar way a garage door stops moving down when touching on something.



Implementation



An implementation is reached through addition of units. It is simple now to pile up the already designed boxes and fit them into any small building plot. Even though the exact position of this implementation is not relevant, a specific site was chosen to demonstrate how several units combined constitute a whole building.

In this case the boxes are shifted in height for structural purposes so the concrete walls can have minimal thickness. The vertical development is situated at the back and is held quite simplistic. The thin white metal structure acts as a counterpart to the heavy concrete walls.

The Site

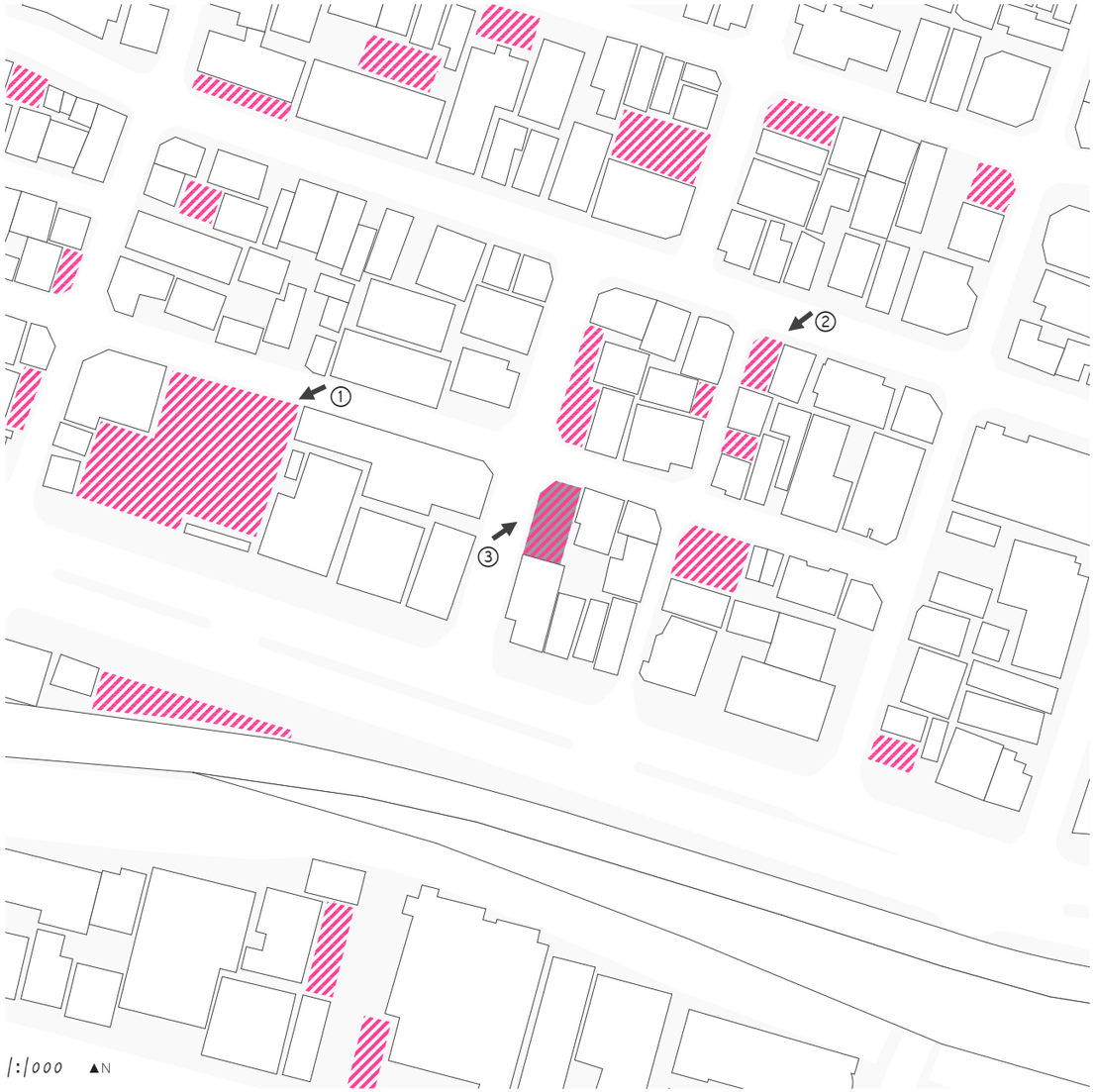
The chosen building site is located in Tokyos Akebonobashi District south of the imperial palace. I chose this area as it displays the cities inhomogeneity at its best. Huge streets are lying beside peaceful residential ones, high-rises next to traditional Japanese houses. The highlighted plot is currently undeveloped and waiting for construction to take place. Momentary it is used for parking cars.

Parking Spaces

Tokyo's urban landscape is diverse. It is dictated by land owner ships, so it comes as no surprise that there are many small pieces of undeveloped properties scattered all across the city. These predominantly small areas are a solid investment and for the time being unused for construction, they create revenue through parking fees.

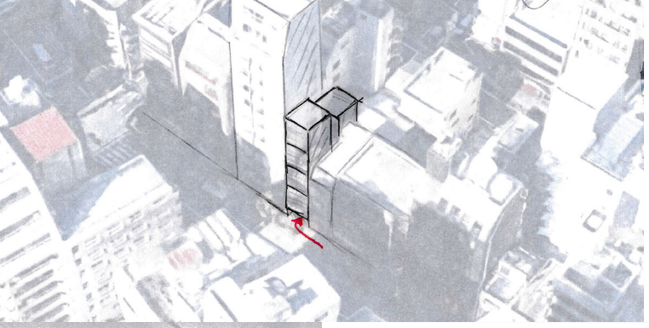
All the areas marked in pink in the plan to the right represent the parking spaces. In this detailed view the amount of those kinds of spaces becomes apparent.

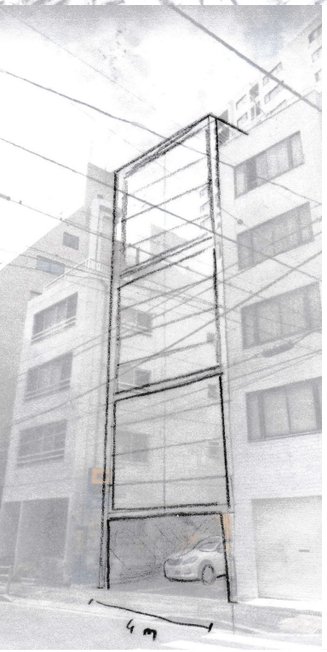
Parking lots are a suitable building plot for the project as the measurements of the living boxes are similar to car sizes.



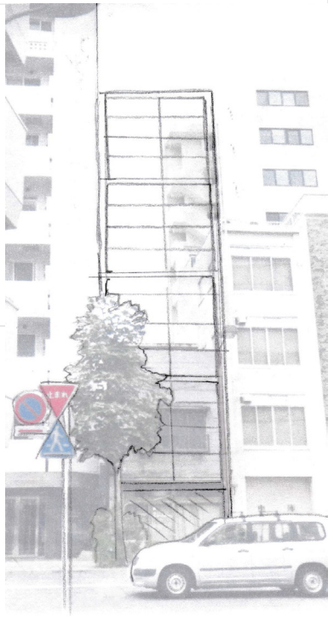
Urban Green

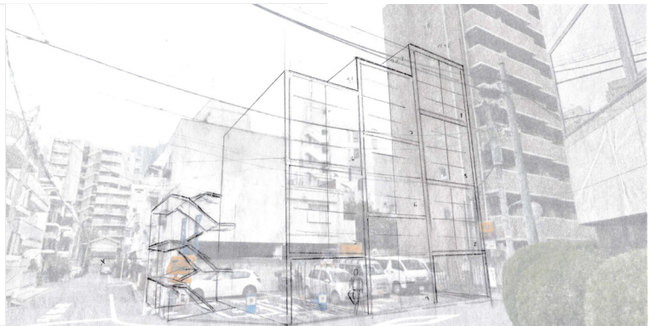
In the map on the right side every single tree is located. This seems very sparse. The Japanese reacted to these circumstances by putting all kind of plant and flower pots in front of their doorsteps or in front of their windows. In that way, even though there aren't many designated green spaces Tokyo appears to be a very green and vital city.





In the process of finding a convenient building plot many opportunities revealed themselves. As it does not matter how the boxes are stacked or linked almost any space becomes a potential building ground. If there is “4.2” metres width the Units can fit.

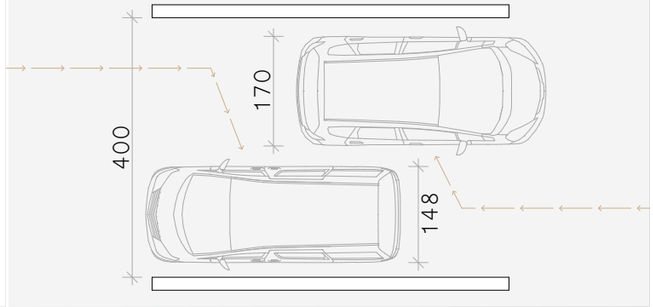


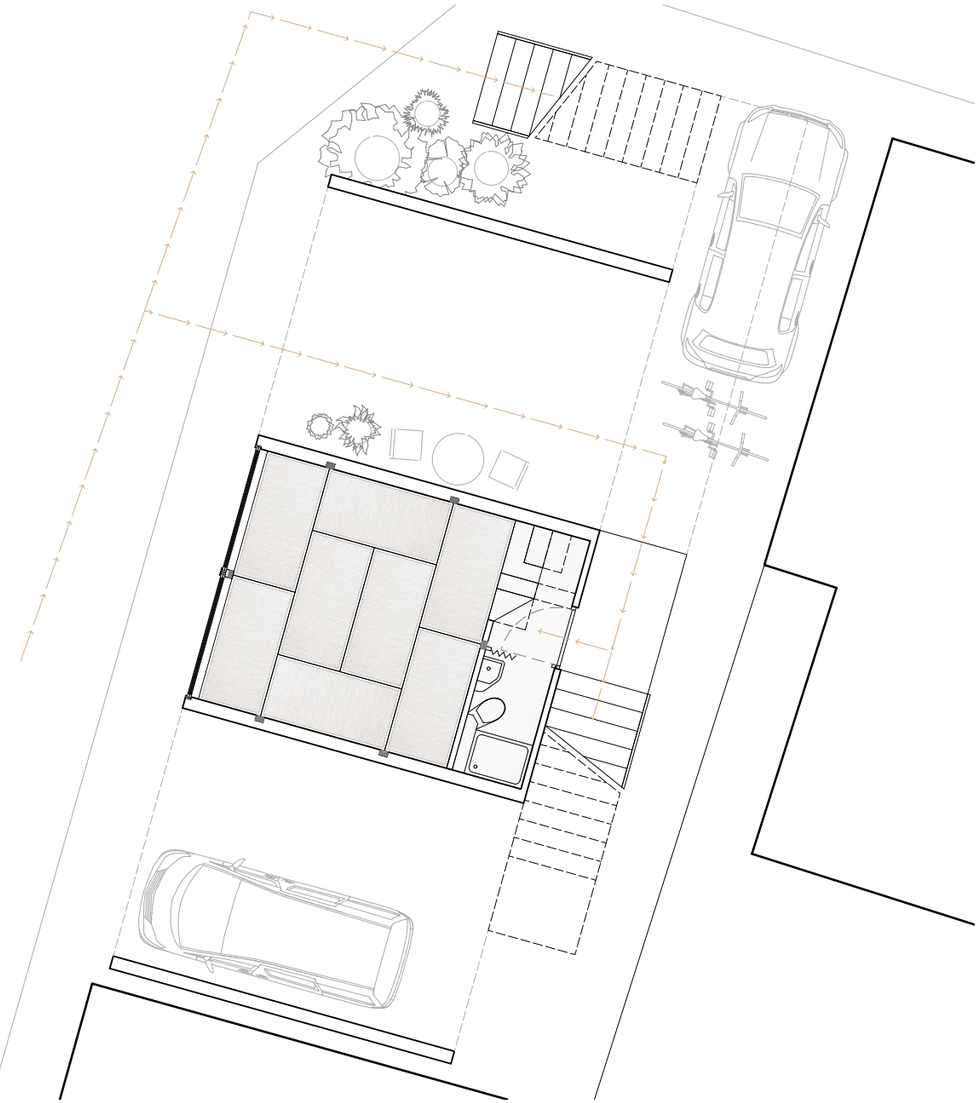


Ground Floor (+1m)

The ground floor plan with a section at 1 meter height. Trying to preserve the existing parking, up to 5 cars can be parked at the same time, considering the Japanese cars sizes. The 2 staircases can be accessed and there is enough space for flower pots.

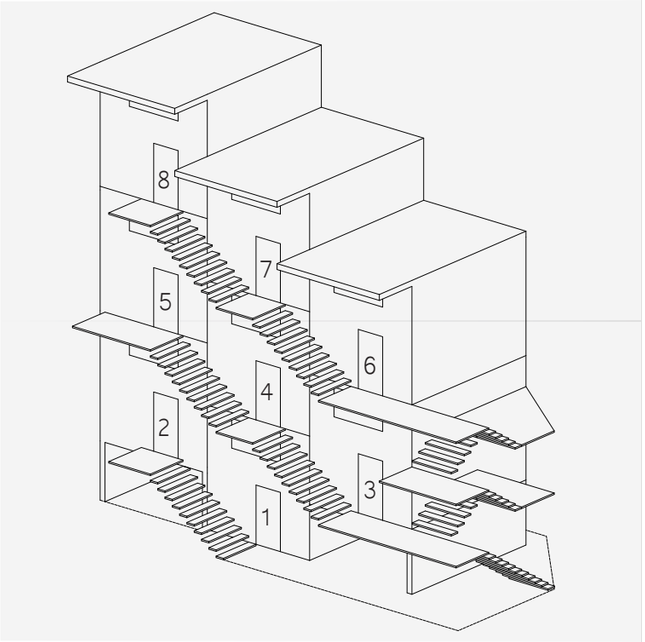
"Kei-Cars" are very popular in Japan as they are only 1.48 m wide and receive tax breaks amongst other advantages.
They consisted of just over one third of domestic new car sales in fiscal 2016. https://asia.nikkei.com/Business/Auto-sales-in-Japan-rebound-to-5m-units-led-by-Toyota



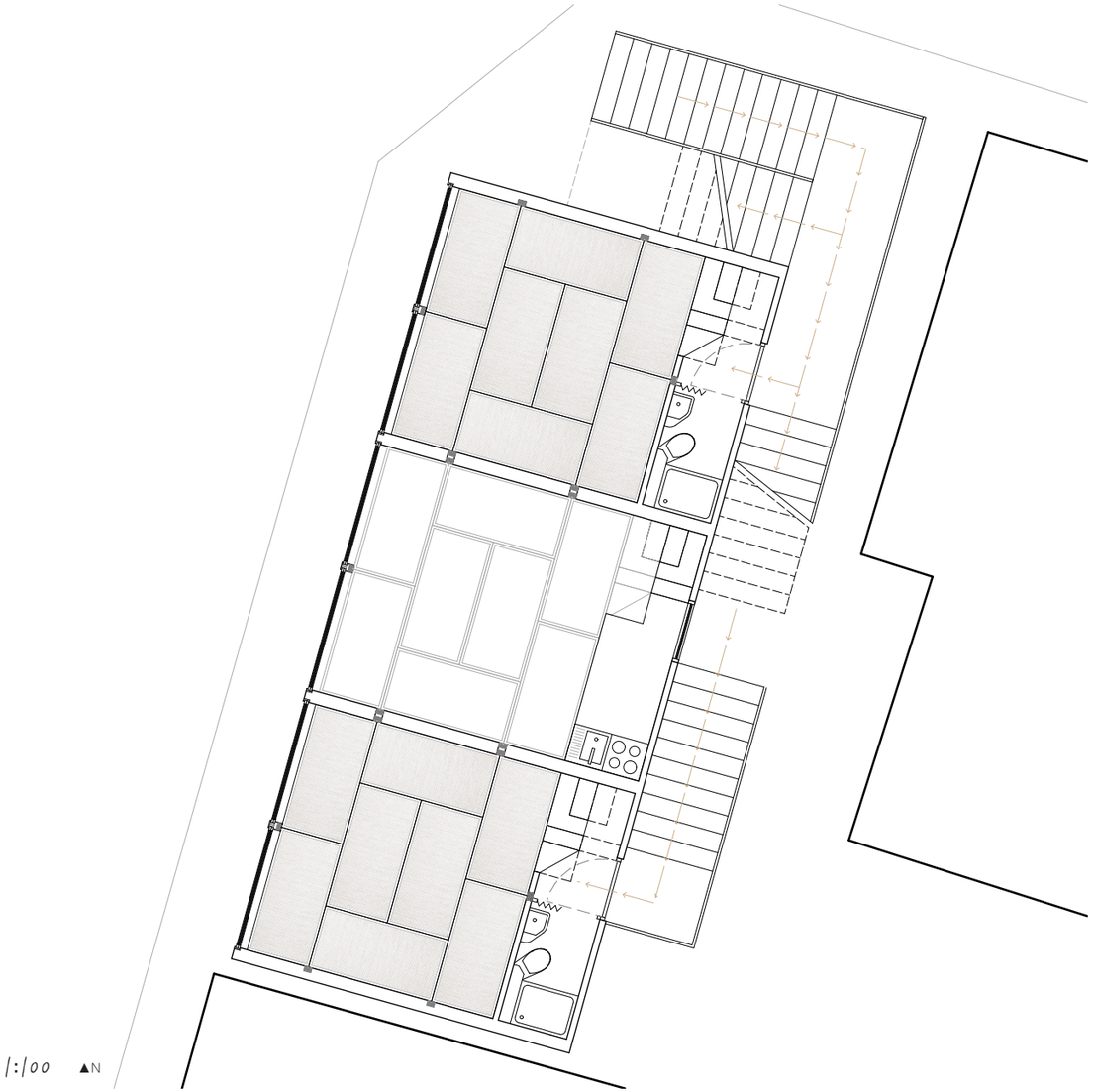


Typical Floorplan (+3m)

The typical floorplan is cut at 3 meter height. From the back the 2 staircases are visible. The smaller one gives access to Unit 1 & 2, which would be suitable for a different kind of use, such as hostel, office or a small boutique.



This vertical development as pictured on this page follows the shifted arrangement of the units and results in a minimal vertical development.



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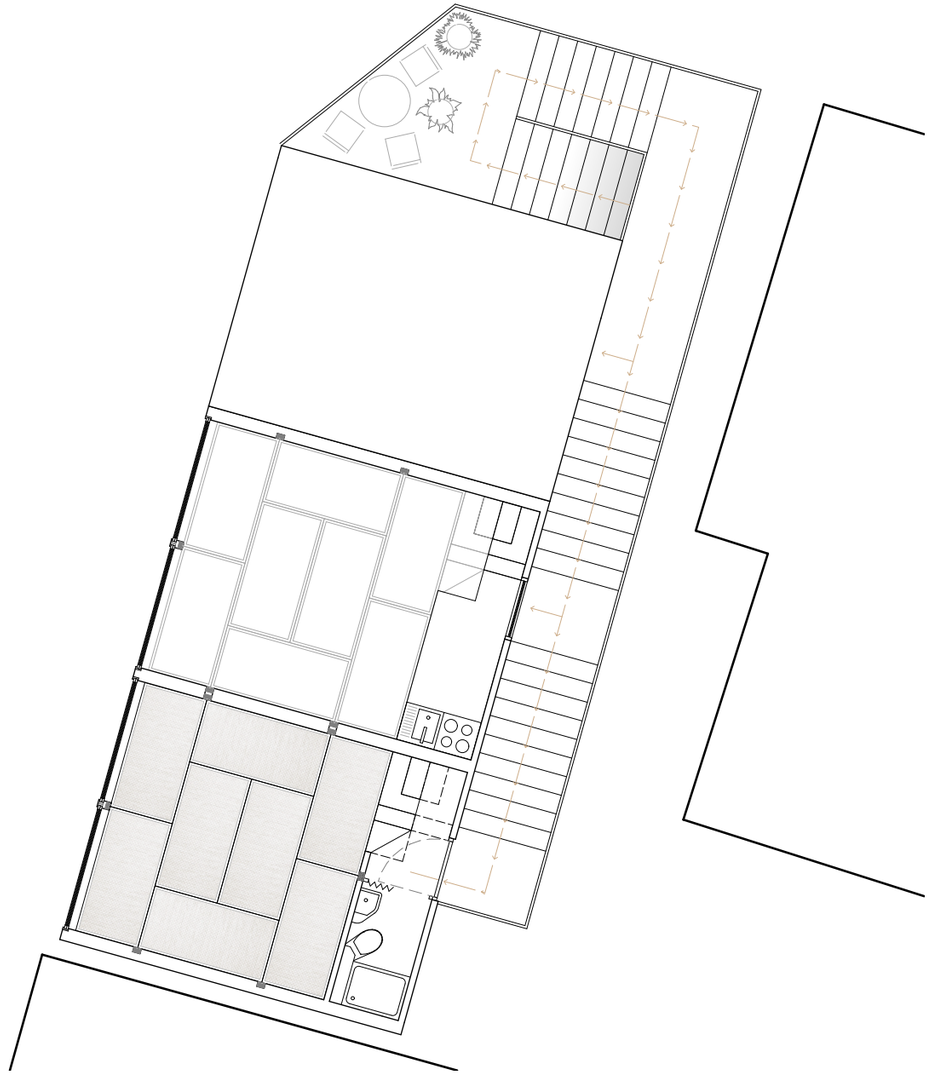
Top Unit Level (+12m)

A small terrace towards the intersection is part of the vertical development.

If this system of shifted boxes is extended, in case the structure can grow, this kind of vertical development gains more advantages. A vertical corridor inside a building block enables better cross ventilation and the light can enter more easily. Also every flat has a terrace exit at the end of the hallway and an exit to the street level on the other.



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