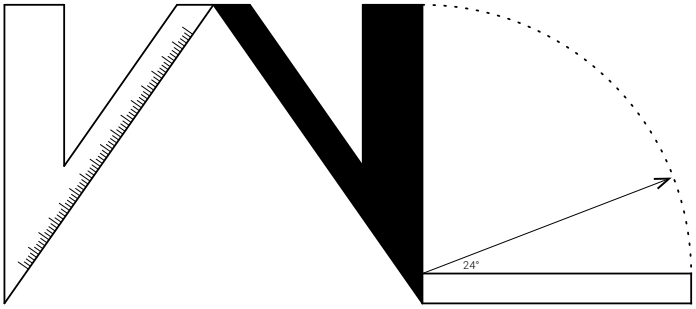


Wan Linxiaoyi

Selected Work 2017-2019

Prologue

Amorphous architecture is my longstanding ambition. It no longer emphasizes rules of form, symmetry or proportion, but the capacity to adapt to the environment.

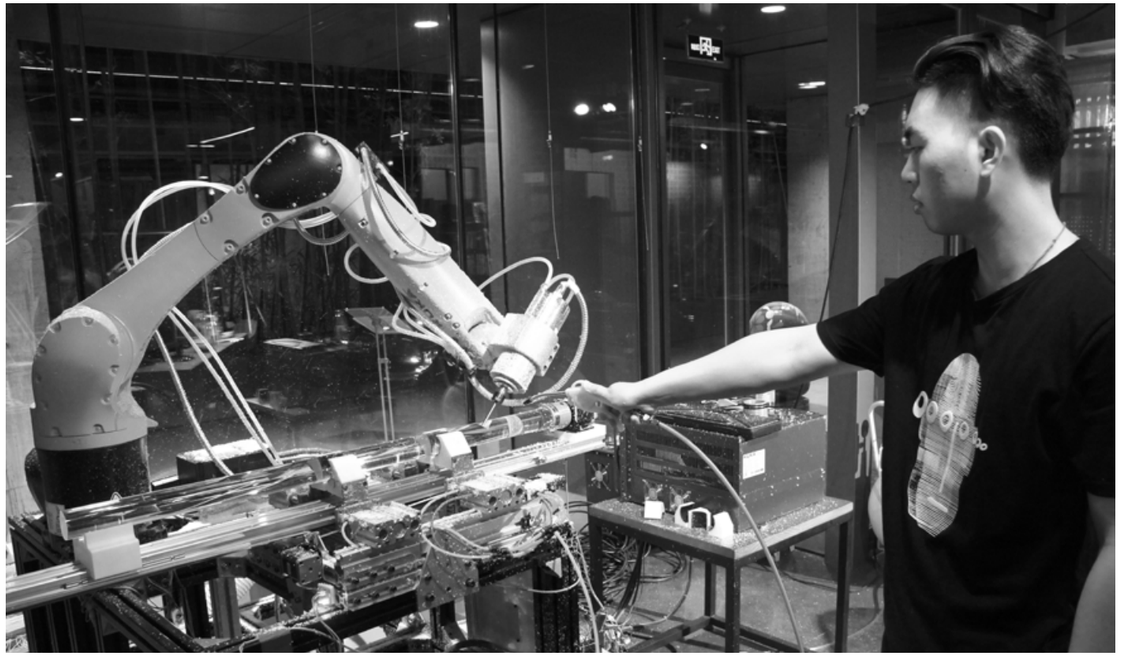
In 1958, Frederick Kiesler coined the concept “endless house”. His idea of borderless space has truly inspired me. Architecture has long been considered to be stable and unchangeable, and such belief restricts the transformation of buildings in terms of space and function, which brings inconvenience to dwellers.

In this light, we should get rid of such notion and deconstruct form of our architecture to improve our quality of living. A telling example comes from the suburban areas of China, where houses are never changeless. In these places, as a family grows in size and their residence grows, they expand their houses accordingly. I envision a future of amorphous architecture, which may contribute to solving these problems. My portfolio explores amorphous architecture in terms of material, structure, city growth and its future application. Through these projects, I have gained a better understanding of this field and sharpened my computing and design skills.

In conclusion, amorphous architecture can be transformed to meet different requirements under the prediction and guidance of computer assisted design (CAD). There are a host of difficulties ahead for me to overcome. For example:

How to balance between transformability with durability of amorphous architecture?
How to weigh up the decisions made by AI and those by architects?

With experience and inspirations drawn from my previous projects, I will continue to make my own contribution to this field.



Linxiaoyi Wan

354 west 110th Street, New York, NY 10025 • lw2869@columbia.edu • (212)300-7199

EDUCATION

Columbia University | Graduate School of Architecture, Planning and Preservation — New York, NY
MS in Advanced Architectural Design — Expected May 2020
Relevant coursework: Studies on Tectonic Culture, Tension/Compression Surfaces, Lines Not Splines, Advanced Curtain Wall, Generative Design

Beijing Jiaotong University | Architecture — Beijing, China
Bachelor of Architecture — Sept 2014-June 2019
Relevant coursework: Architecture Physics, Architecture Facility, Architecture Design, Urban Design, Landscape Design — GPA 3.75/4.0

WORK EXPERIENCE

MR Studio (Lead by Mark Rakatansky) — New York, USA
Assistant Designer — Dec 2019 Feb 2020
- Project design and improvement
- Adjust plan according to client requirement

ASW (Archi Solution Workshop Co) — Beijing, China
3D Printing Developer & Assistant Designer — Sept-Dec 2018
- Developed and updated 3D printing programs
- Produced schematic design and 3D printed prototypes
- Managed and maintained 3D printing facilities

BIAD (Beijing Institute of Architectural Design Co) — Beijing, China
Project Manager Assistant — Oct-Dec 2017
- **Built Project :** Beijing New International Airport Express Toll Station And Surrounding Landscape Design and Construction, Beijing, China
- Project design and improvement
- Grasshopper Modling and adjustment

COMPETITION EXPERIENCE

- 2017 National Undergraduate Architectural Design Competition — Mar 2018
  Recognition Award
- 2016 Capital Undergraduate innovation and entrepreneurship competition — Dec 2017
  National 1st Prize
- The 9th Capital “Challenge Cup” Undergraduate Curricular Academic Science and Technology Works Competition — Sept 2017
  National 3rd Prize
- The 14th Asian Design Year Award — Dec 2016
  3rd Prize
- National University Real Estate Innovation and Entrepreneurship Competition — Dec 2016
  2rd Prize & Best Expression Award

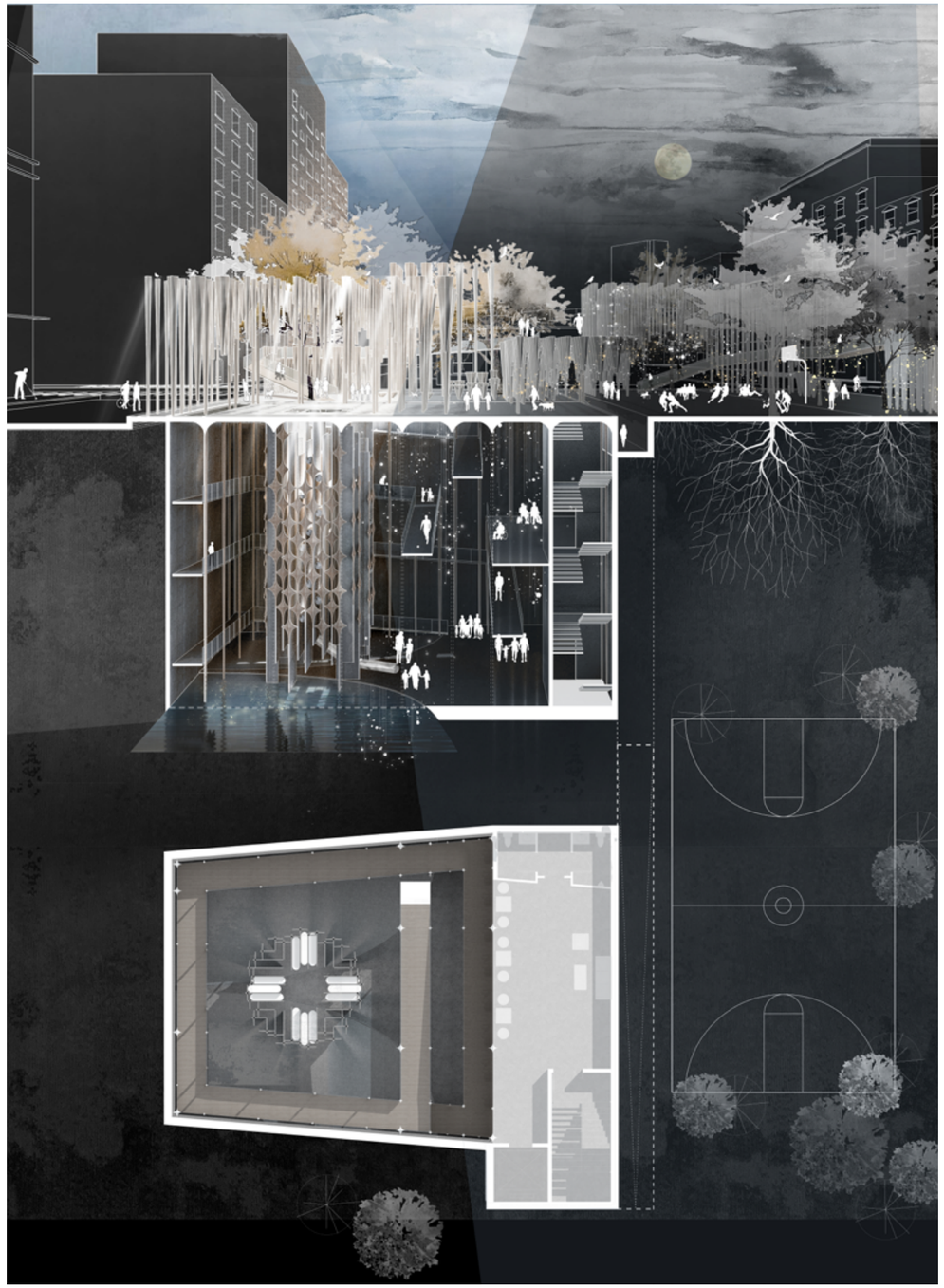
LEADERSHIP & ACTIVITIES

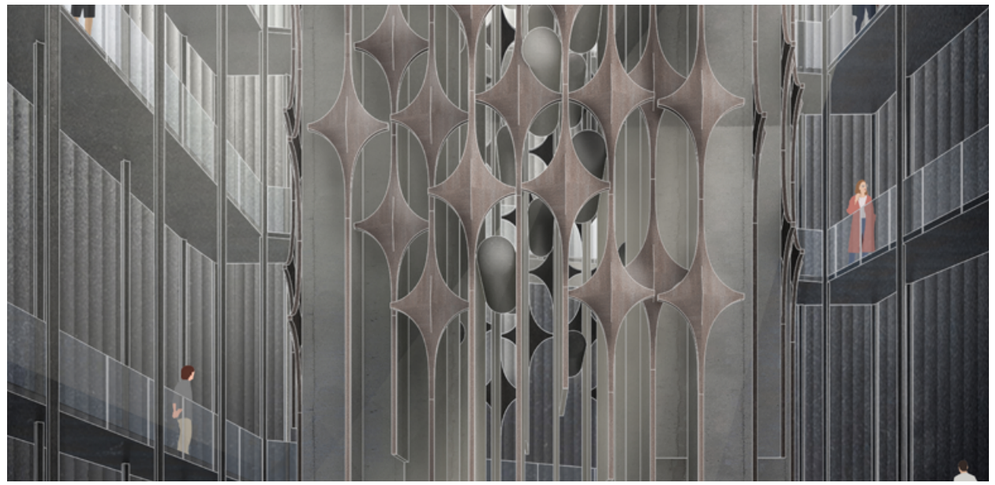
- **Technology, Entertainment and Design (TED),** President, Beijing Jiaotong University — Sept 2017-Sept 2018

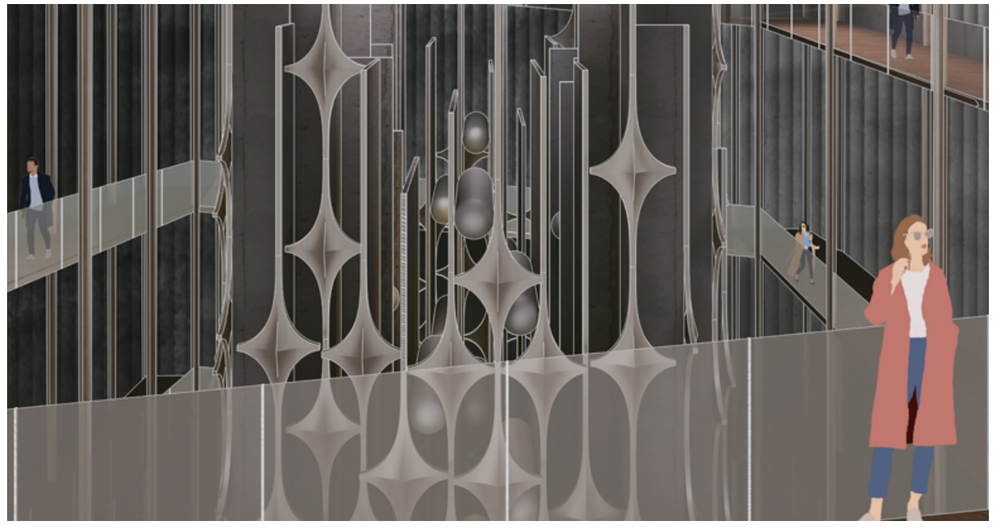
SKILLS

Software: Rhino, SketchUp, Processing, Grasshopper, Ps, Ai, Id, Lr, Pr, AutoCAD
Coding: Python, Pascal
Languages: Chinese, English

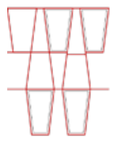
Grave in Soho

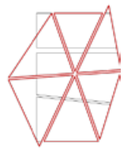


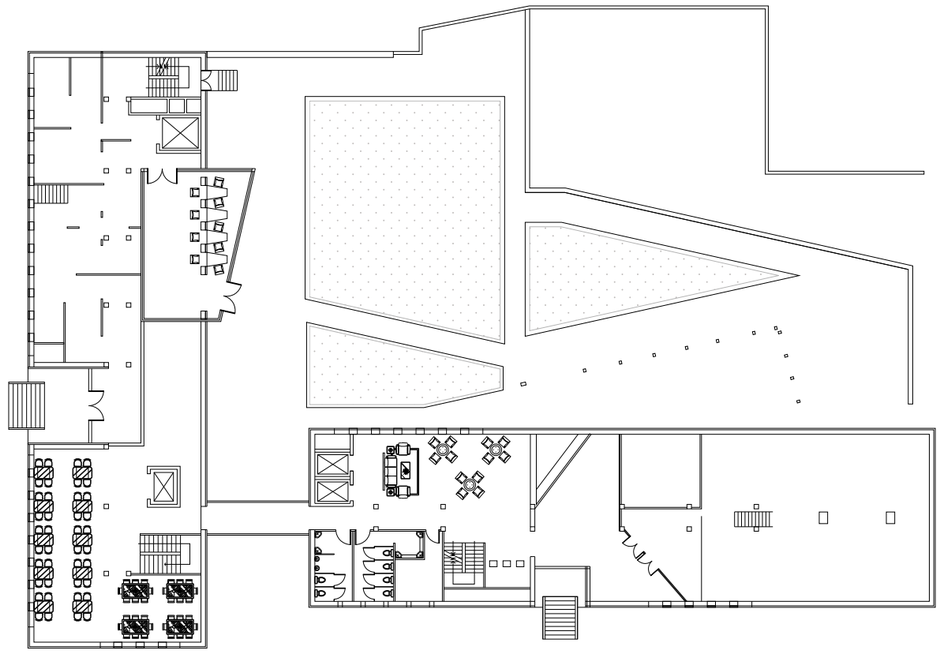


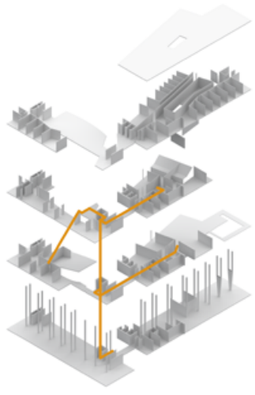



THE REMIX

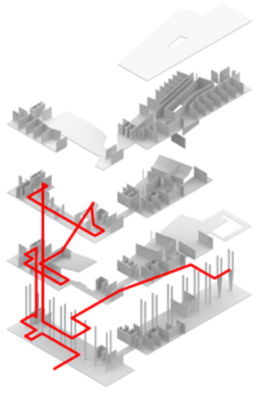




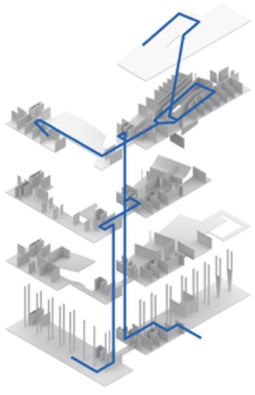




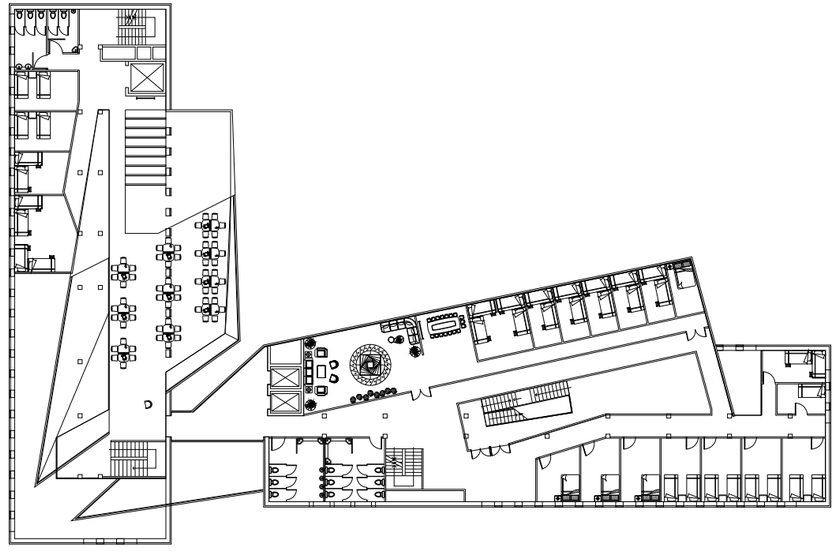
CONFERENCE FLOW

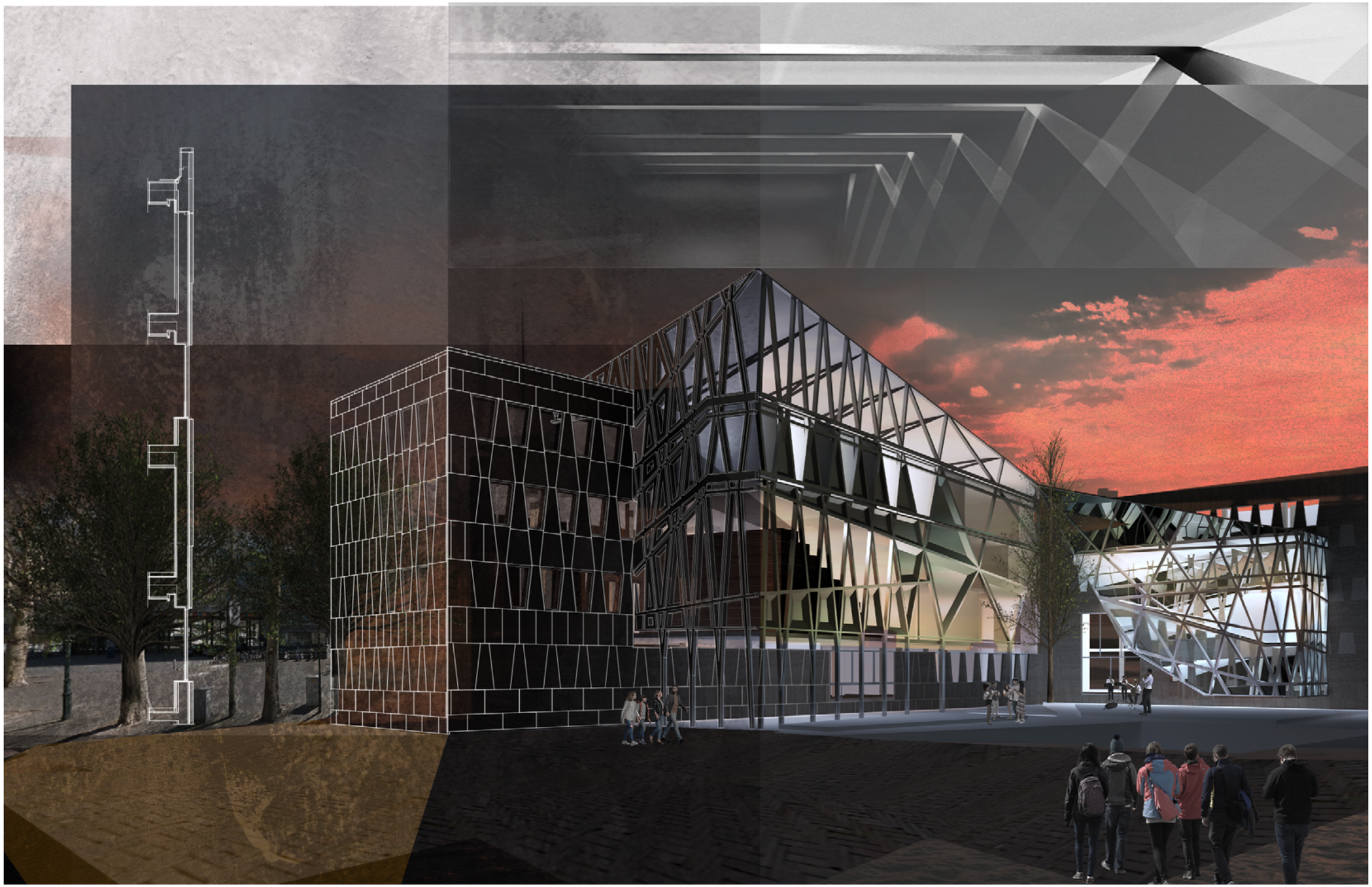


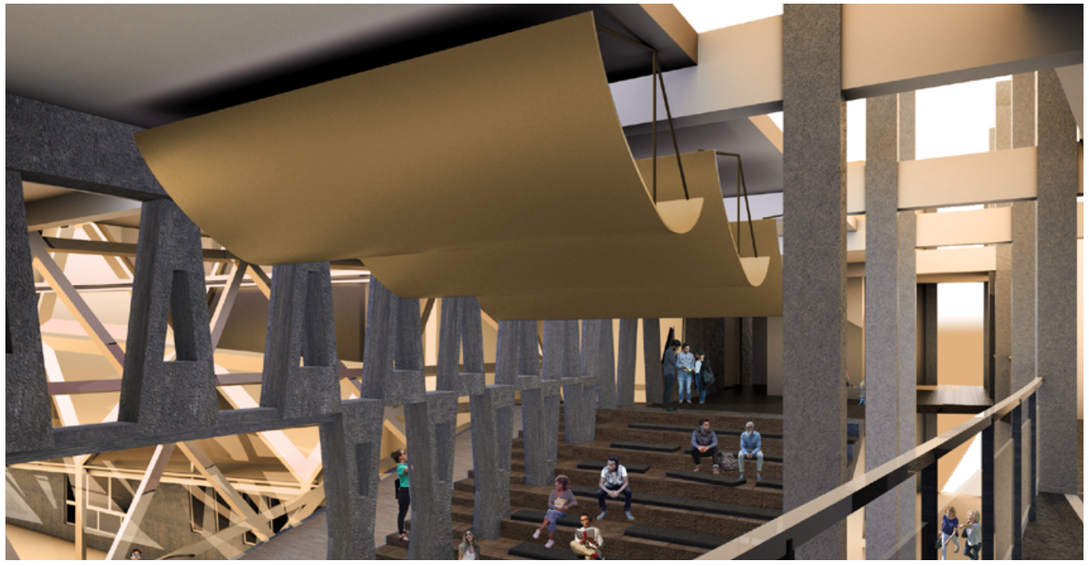
MUSEUM FLOW

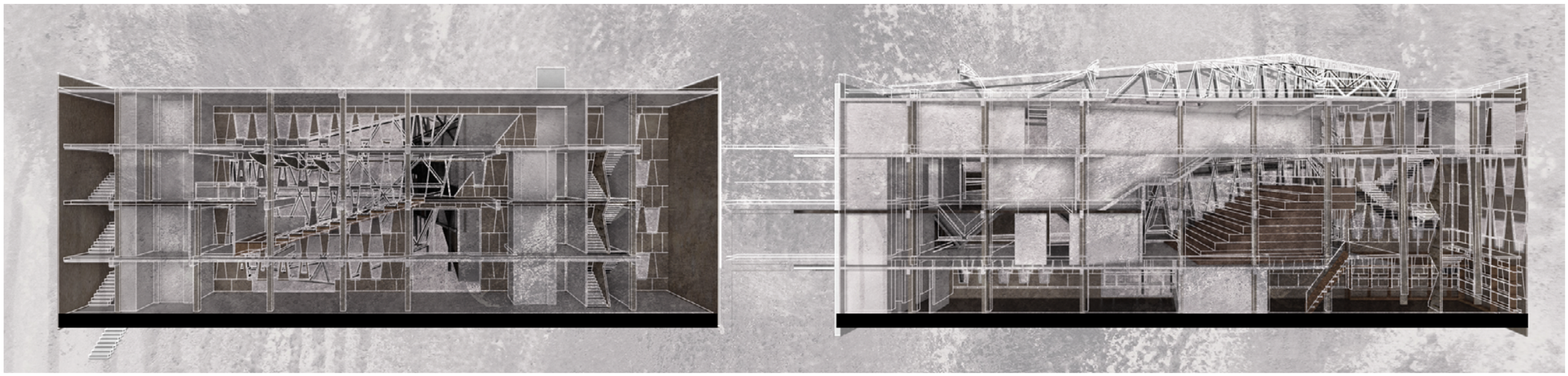


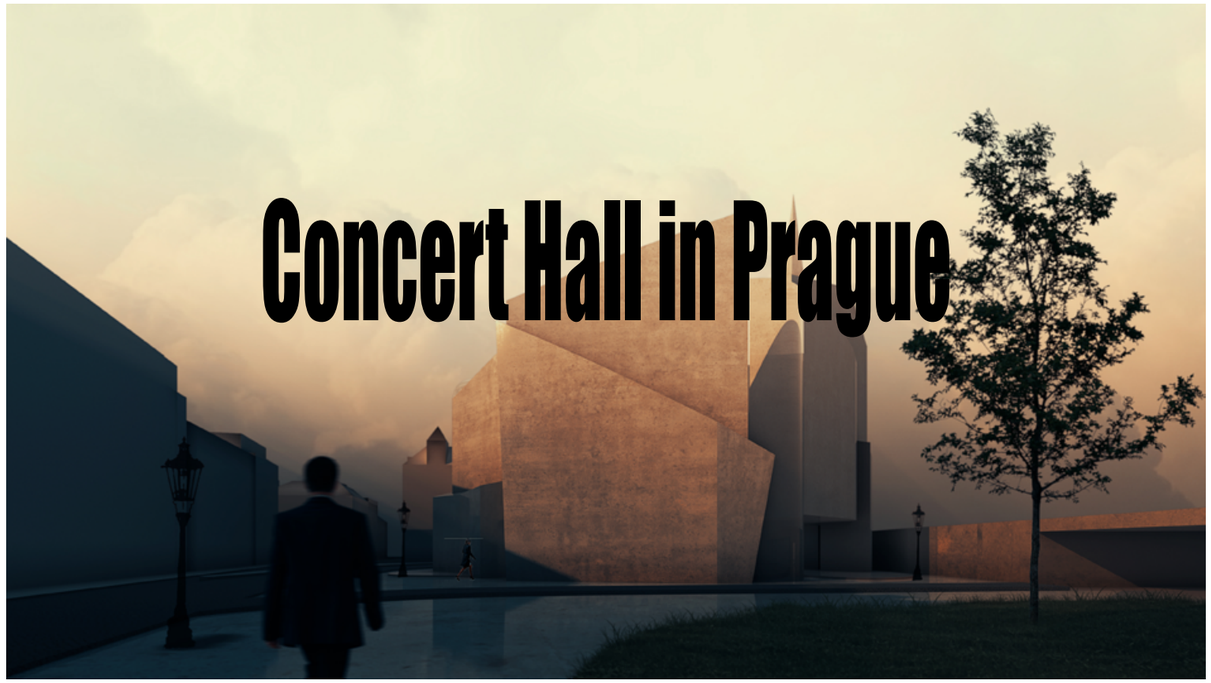
HOTEL FLOW

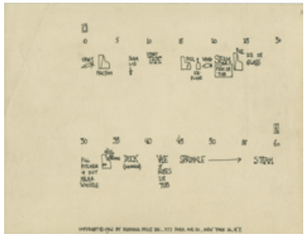


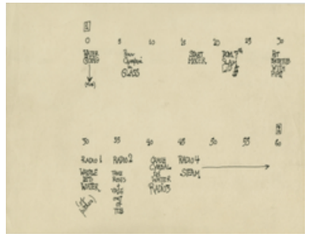







Concert Hall in Prague

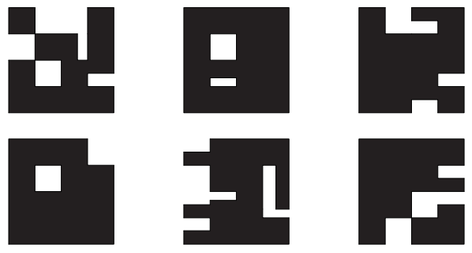


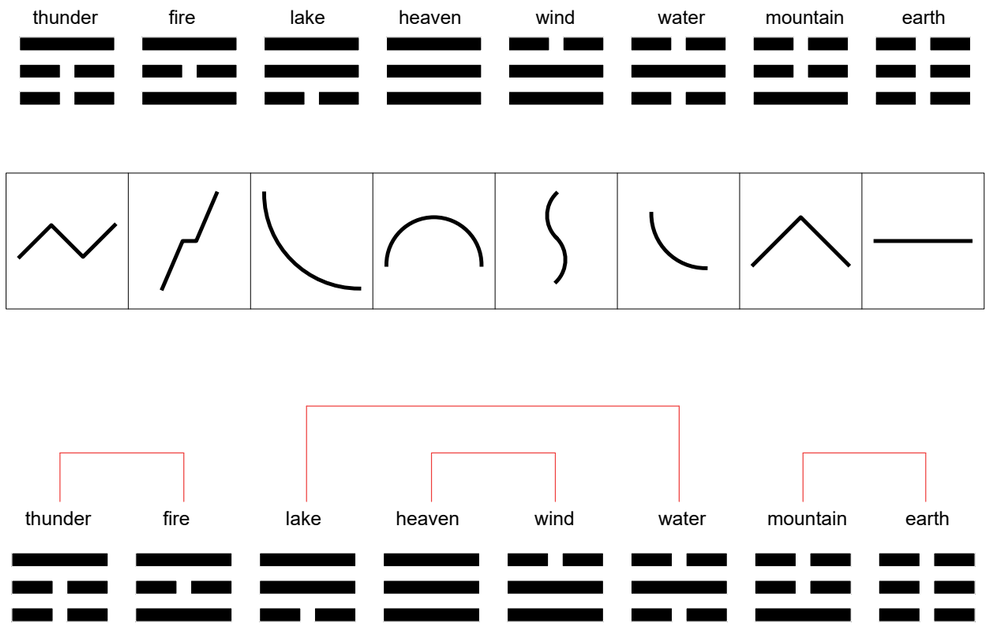


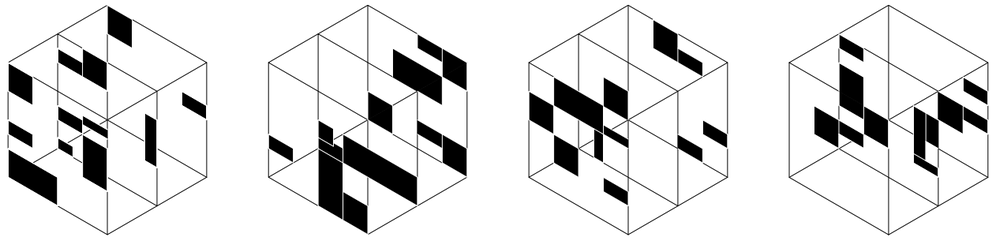
water	mountain	mountain	fire
mountain	fire	wind mountain water	water
water	mountain		water earth
water heaven			wind

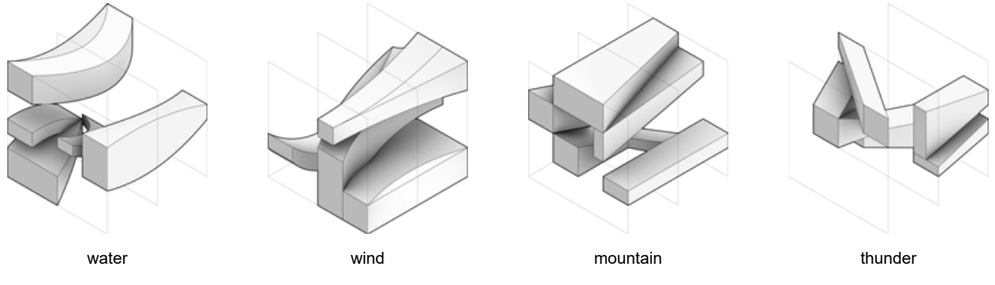
fire water	water		
fire	mountain		fire water
fire water	fire water earth		fire water fire
fire heaven			

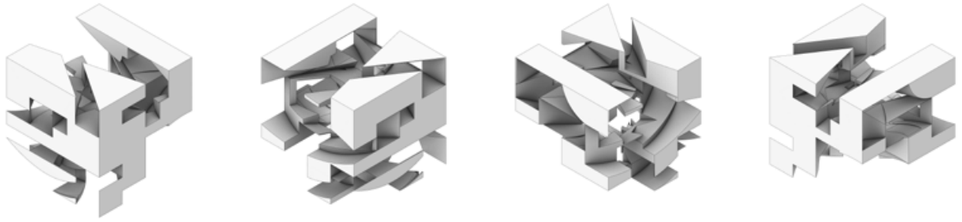
water	mountain	wind mountain	wind
	wind	wind	fire water
		fire	fire mountain
wind	fire	wind mountain	wind

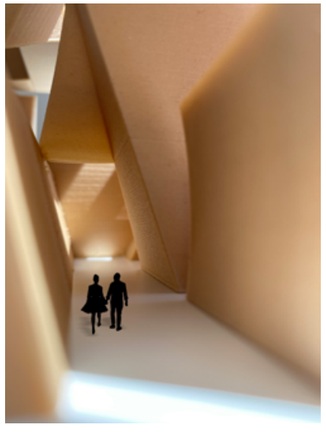


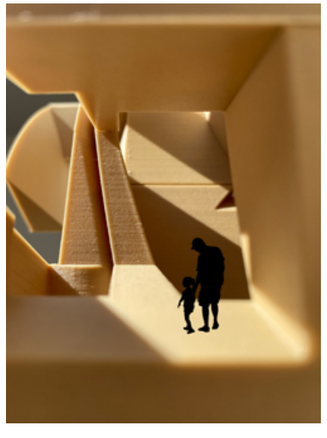


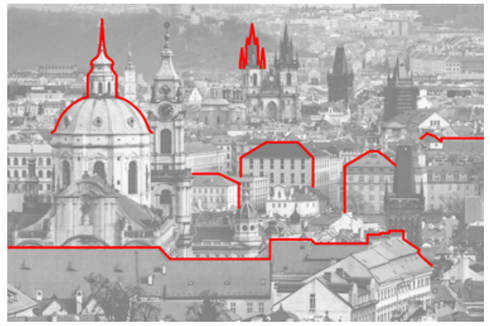


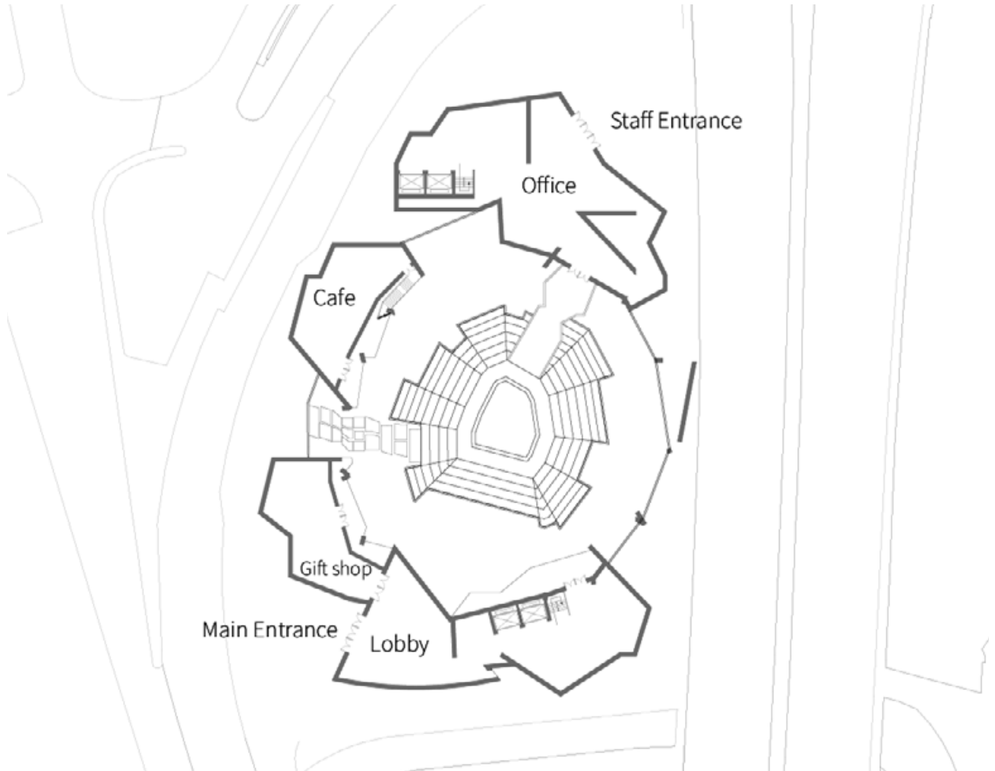


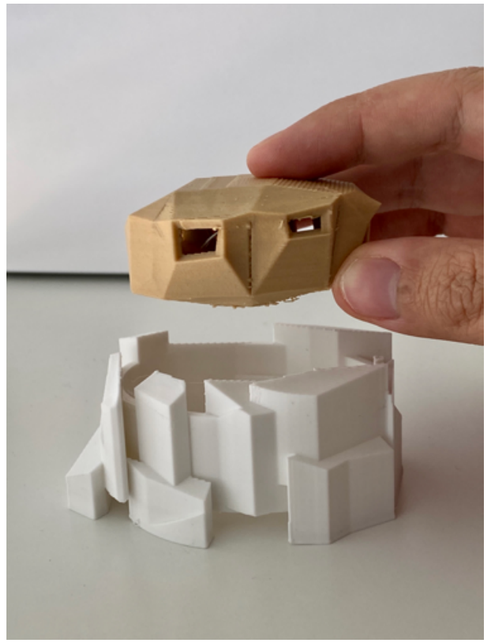


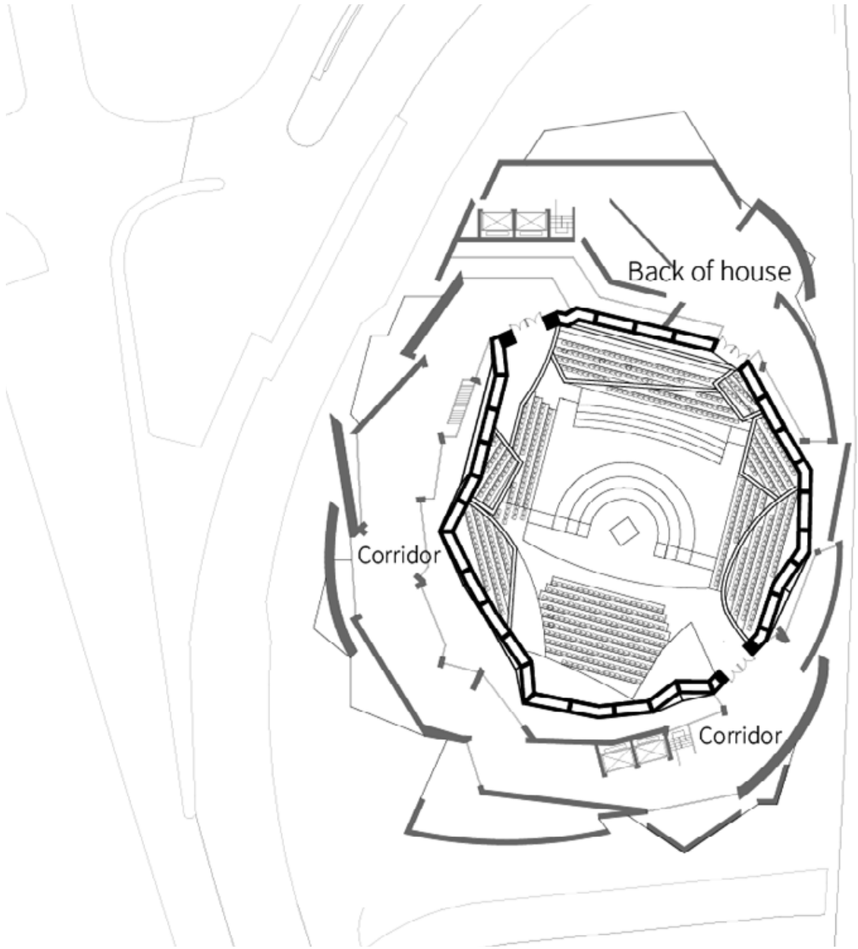


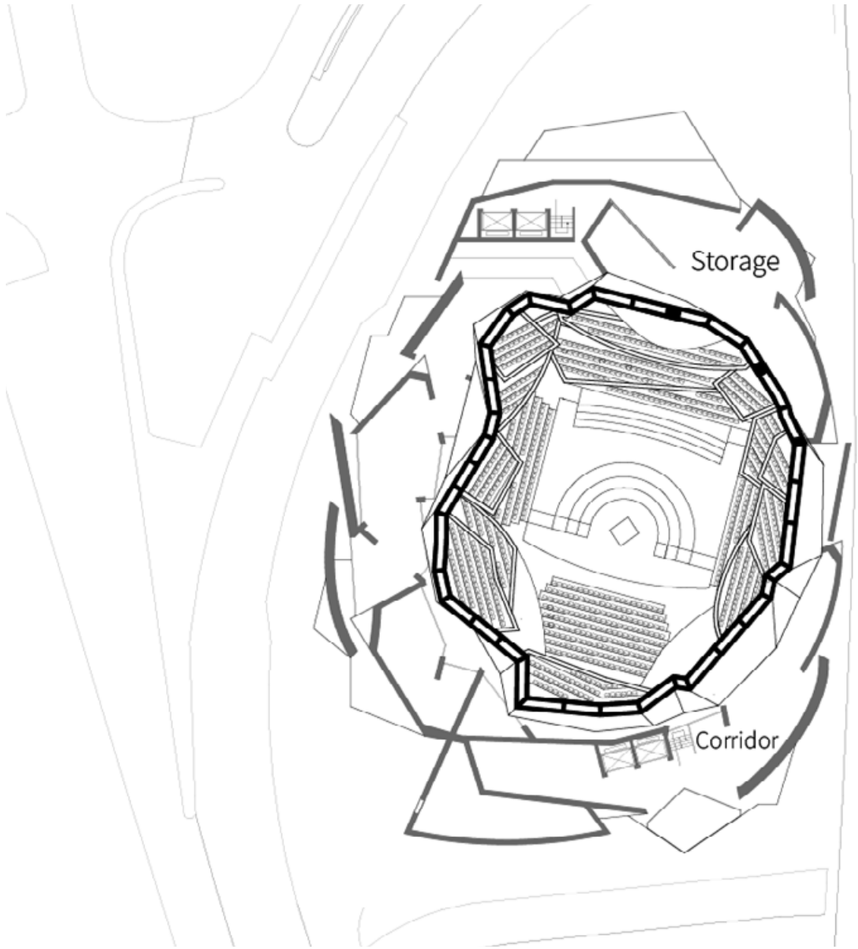


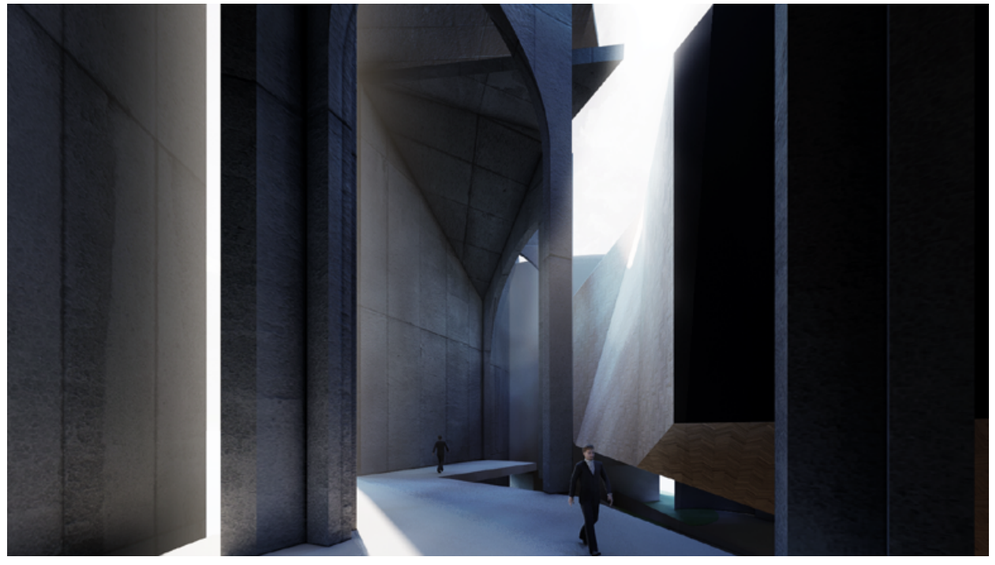


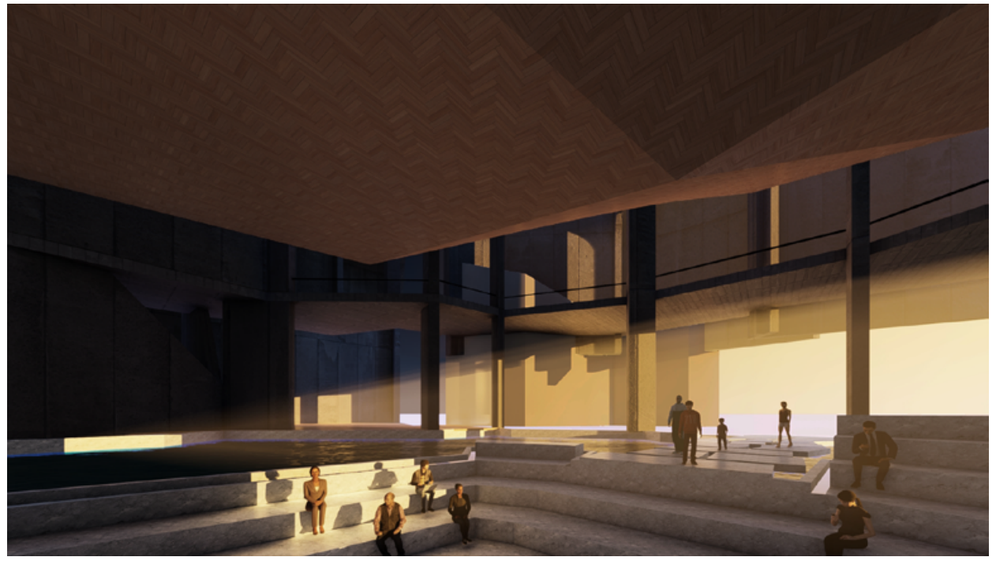

Staff Entrance
Office
Cafe
Gift shop
Main Entrance
Lobby

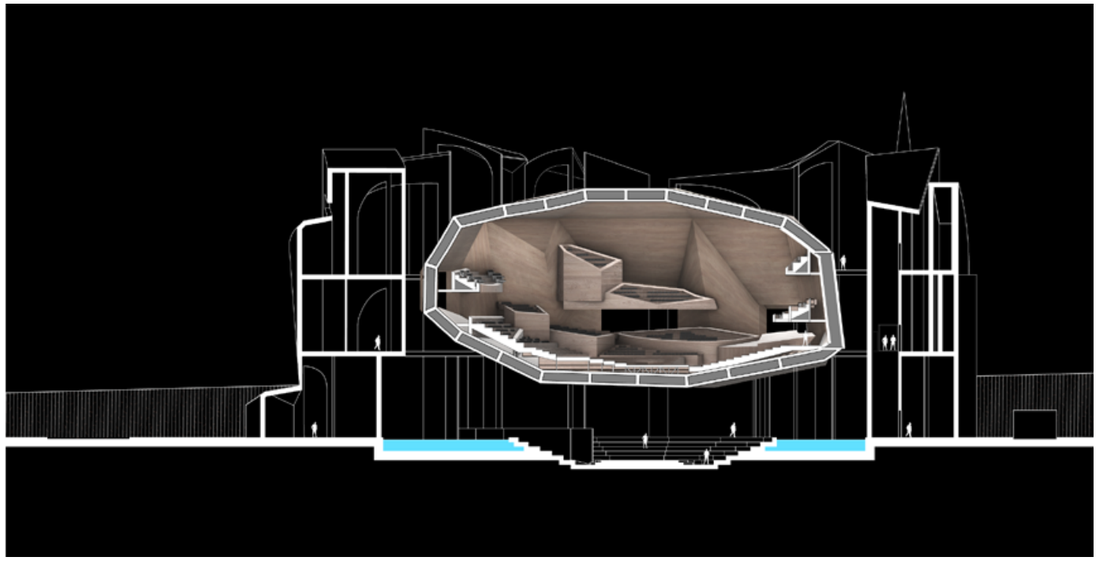



Back of house
Corridor
Corridor

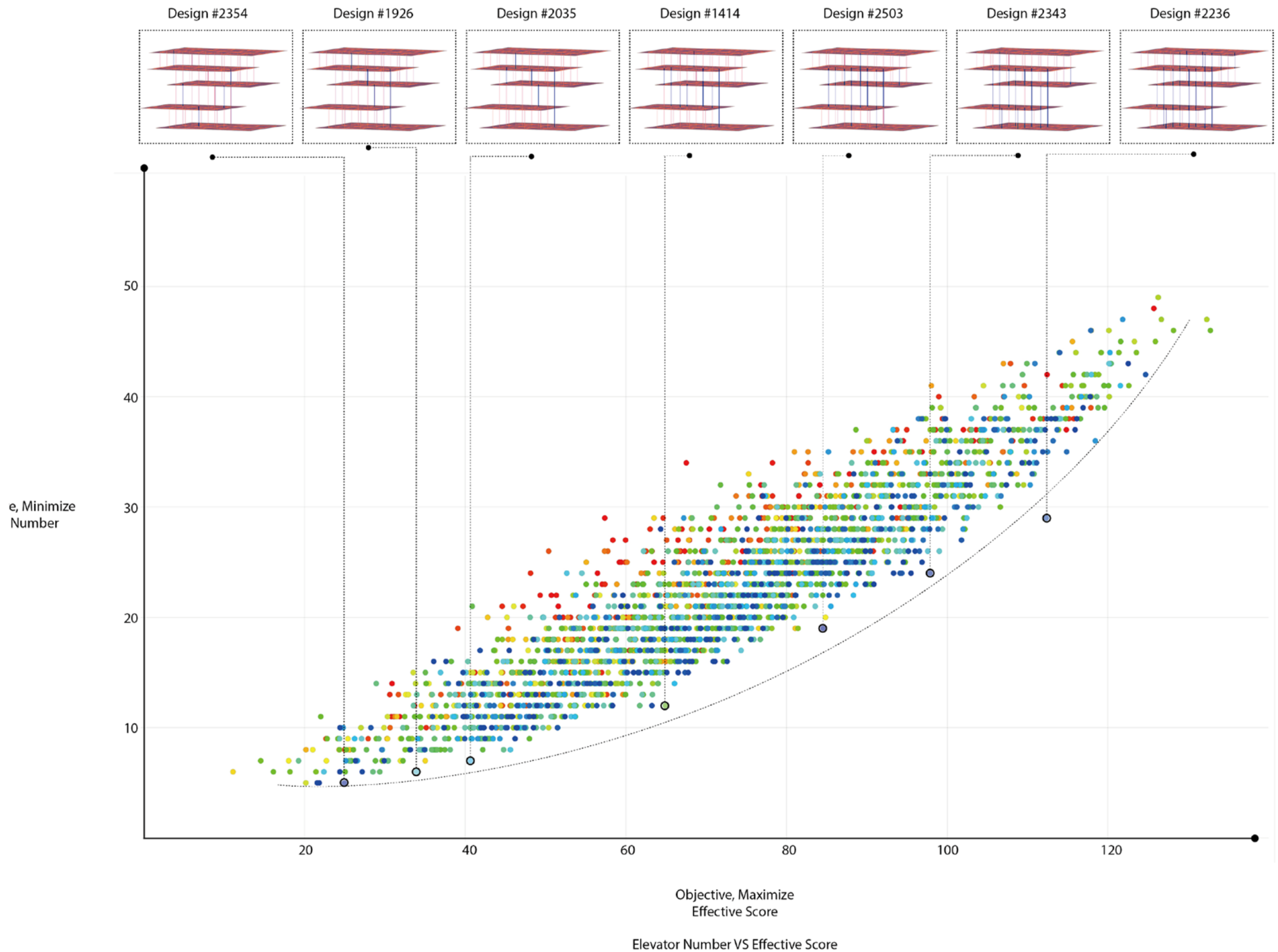

Storage
Corridor







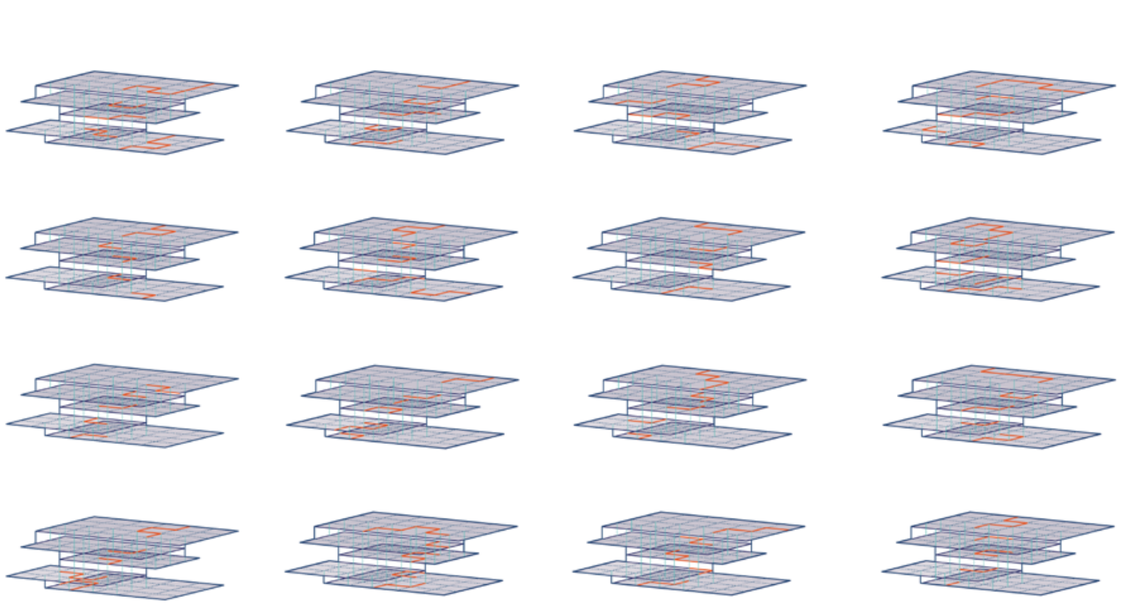
Generative Design


Design #2354
Design #1926
Design #2035
Design #1414
Design #2503
Design #2343
Design #2236
e, Minimize
Number
50
40
30
20
10
20
40
60
80
100
120
Objective, Maximize
Effective Score
Elevator Number VS Effective Score

Generative Design

Pro. Danil Nagy

Team: Wan Linxiaoyi, Hyeokyoung Lee, Liu Xinyue, Isabelle Modler



Introduction of Vertical Circulation:

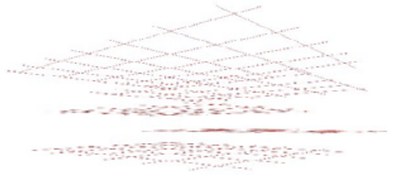
We focus on the problem about how to make the elevators in the building work more efficiently and cost lesser. To meet those requirements, we try to optimized the location and numbers of elevators.

Because the location and length of the elevator in a building have thousands of hundreds of different solutions. It will be impossible for traditional design approach to find the best solution. In normal situation, architects make their decision base on their work experience. Sometimes it will work, but in several situation this kind of random decision will cause many troubles to people who stay in the building. For instance, employees have to walk a long way from work space to the elevator and at daytime rush hour the elevator will be jammed by crowd of people.

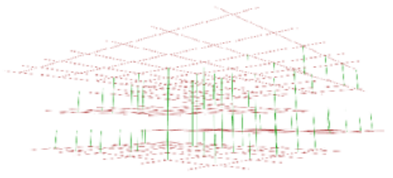
Method we use:

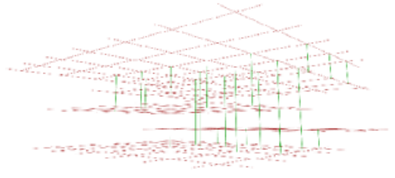
Design space model:

First, we set five basic surfaces to represent five floors. To imitate the paths in the building, we need a grid on every floor, so that paths will follow the grid. This will help us to reduce the calculation amount. We set the grid as 50cm*50cm. And then, through Bounding Box and Grid Structure we get the grid and project grid to those five floor surfaces. In this way we arrive half way to set the space model.



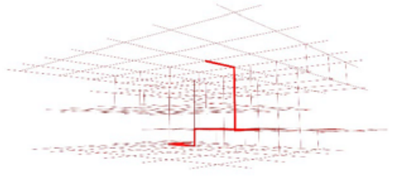
Next, we need a grid in vertical direction. Based on grids in floors, Move component and Line component help us move the points in grid and get these vertical lines. And through Point in Brep and Dispatch we can select those lines which inside bounding box could work as columns to support floor panels. At the same time, these column lines can be regarded as possible vertical transportation core.





After all these pre-set we have another task to be done. How to find paths that can cover every possible road from one point to another? In the beginning, we try to use agent simulating system to imitate that

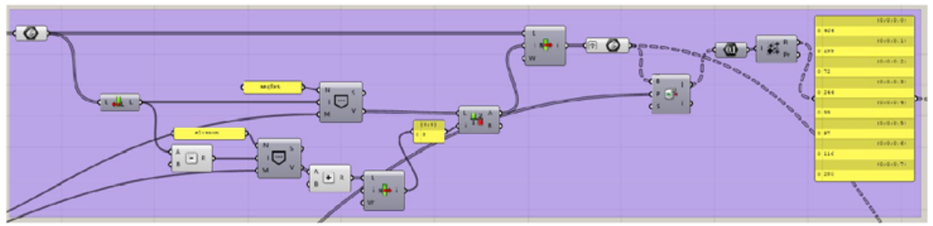
behavior. Obviously, that will increase both time complexity and location complexity. However, there is another algorithm called Group Theory which can help us solve this problem. Meanwhile, with the help of Cylinder and Explode Tree we can split those columns by floors.



Our solution to optimize elevator location would be calculate how many paths pass select columns, and minimized columns number. In this way, our objective will be maximized number of how many paths go through each selected column and minimized selected columns number. With the use of Point in Breps and Point on Line we can judge if this path has a segment within the columns brep or not. After judgment we accumulate all those paths and record as scores of each selected column.

Input parameters:

We use Discover as a generator to select columns from a list.



Seqset Sequence ->
Which set of elevators, (if the number is set as 3), are good enough to use. They will have different performances, such as chosen set of 3,2,1 elevators is better than chosen set of 3,8,7 elevators.
Elvnums Sequence ->
To select how many elevators would be more effective than ever out of that set.

So, if Elvnums are set as 3, it can choose 4,2,8 or 3,1,7 out of different set of (4,2,8,9,0,6) or (3,1,7...) -> then which one is better
Or, If Seqset is set as (6,5,3,2,1,4,8,7,9) then how many of them actually more effective than others.

It could be positively, (6,5,3) is maybe better than (6,5,3,2). Cause our objectives are not going with, Minimize the elvnums, while maximize the paths that are used in elevators.

Performance metrics:

There are 2 objectives.

One is the 'number of elevators', to minimize. Obviously, the goal is to minimize the number of elevators, only using effective ones.

On the other hand, the other one is to maximize, the 'path-score'. The higher it has paths between the points, the higher score it has.

As a result, based on all generated shortest-paths between every point, each elevator has its own ' path-score'.

Input parameters are simply defined as 2 questions.

1. How many elevators should we use, one at least, on each floor?

then after 'set' of elevators are defined,

2. Does that specific 'set of elevators' have higher path-scores than other sets?

By the sequence of 1 & 2, parents would be sort and produce the next generations.

As a result, this algorithm would push after generations to be more high scores than previous generations.

Here are a loss and gain. If the designer wants to gain more effective scores, he should use some more elevators.

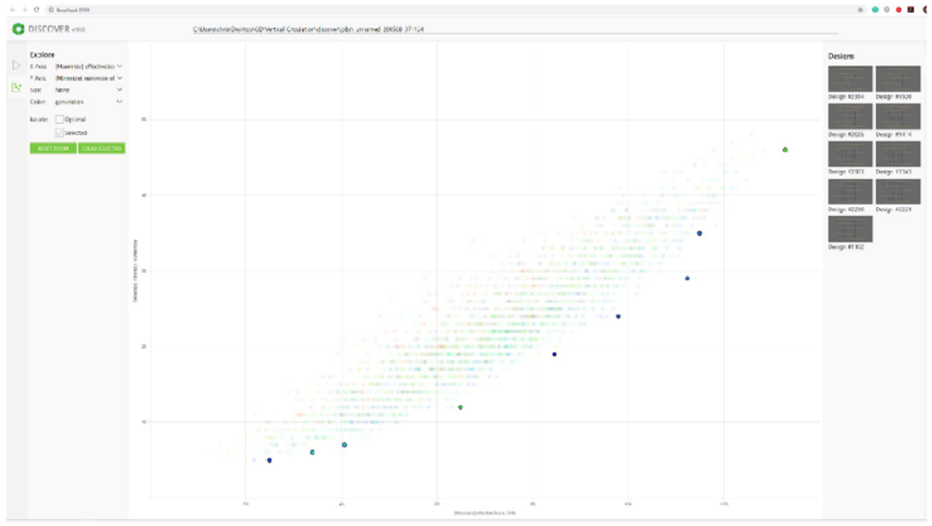
However, this algorithm would help him again by showing which 'certain set' of that 'more elevators' is more effective than other sets of elevators.

Finally, the goal is to, help the designer choose elevators, but only effective several ones.

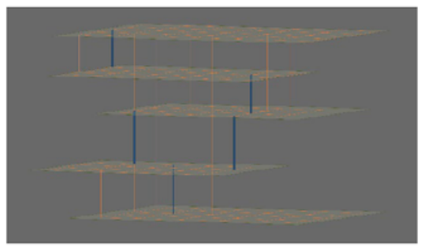
Ex) 1. The designer wants to have a 10000 path-score of elevator sets. This algorithm would give him several optimized options of a minimized elevator set (such as locations, numbers, assigned on each floor). Then he will choose between them.

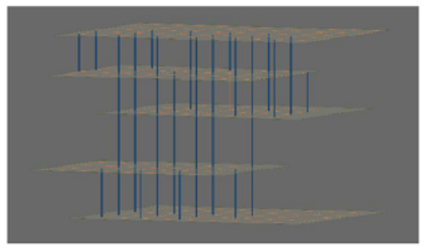
2. The designer wants to have only 20 elevators. This algorithm would give him several best options of those elevator sets (locations, scores, assigned on each floor). Then he will choose among them.

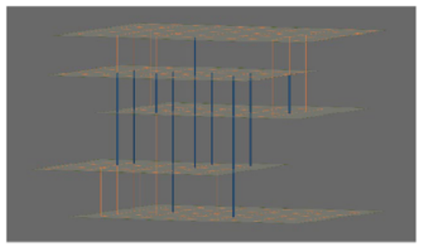
Results:



Through these screenshots from Discover we can tell the relation between ElvNumber and EffectiveScore. We find the trend of best solution is with the Score higher the Number gets higher. ElvNumber and EffectiveScore have positive correlation. From the best solution screenshots we find that with the Score higher the elevator gets more centralize.





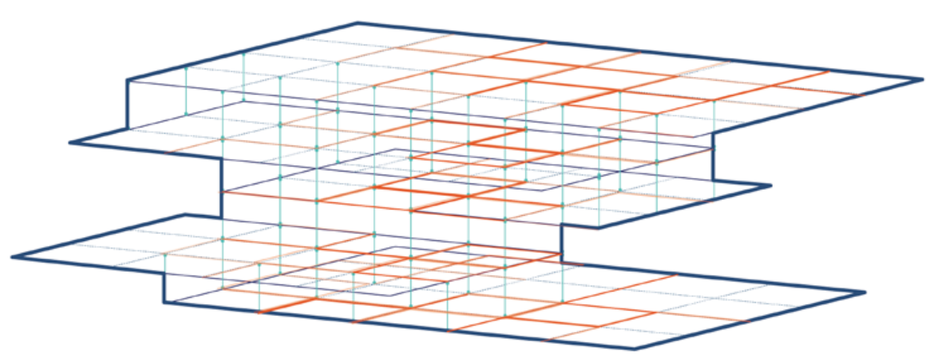


Conclusion:

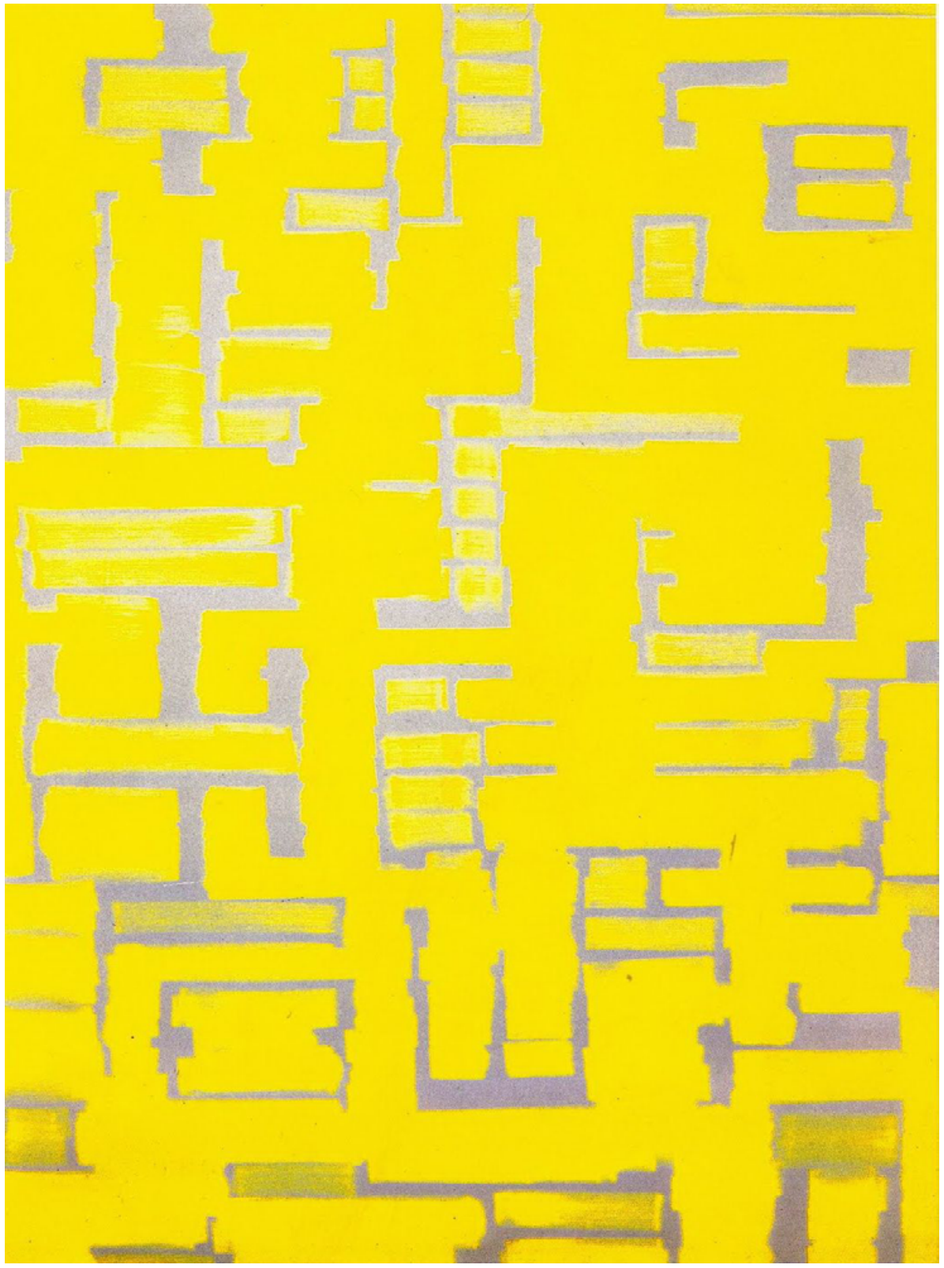
Through this project, we find this method we use could be expand into an interesting question, if the building have its own “spaciality”. Spaciality is a kind of quality, like materiality, which will never change by people’s will. We think the space may have a function as a way to influence people’s behavior and its own quality is unique and unchangeable.

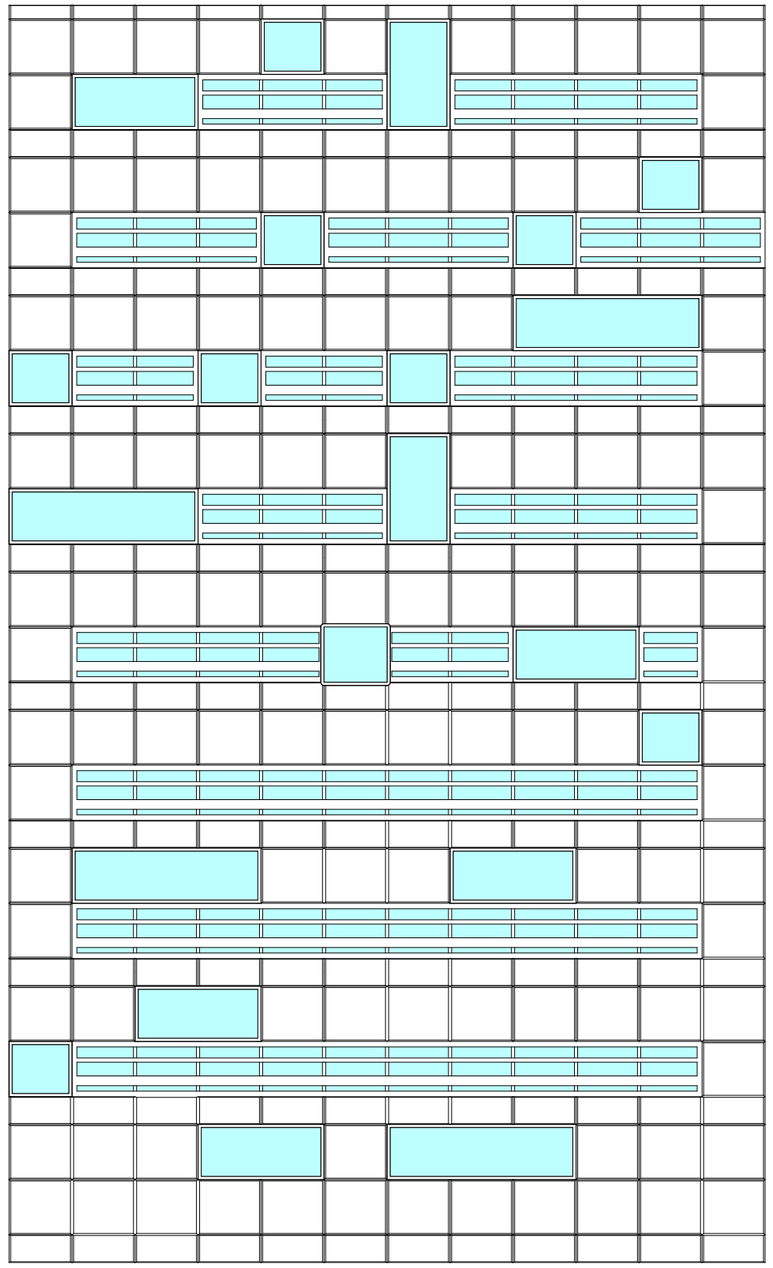
In a way, our problem could also be view as a Topology question. First, we abstract every line into a node. Then we count the steps of each node to other nodes. Last, we accumulate every step numbers from one node to others and record its reciprocal as tangible value (TgV). What is foreseeable is that nodes on the edge will have much lower TgV than those around center.

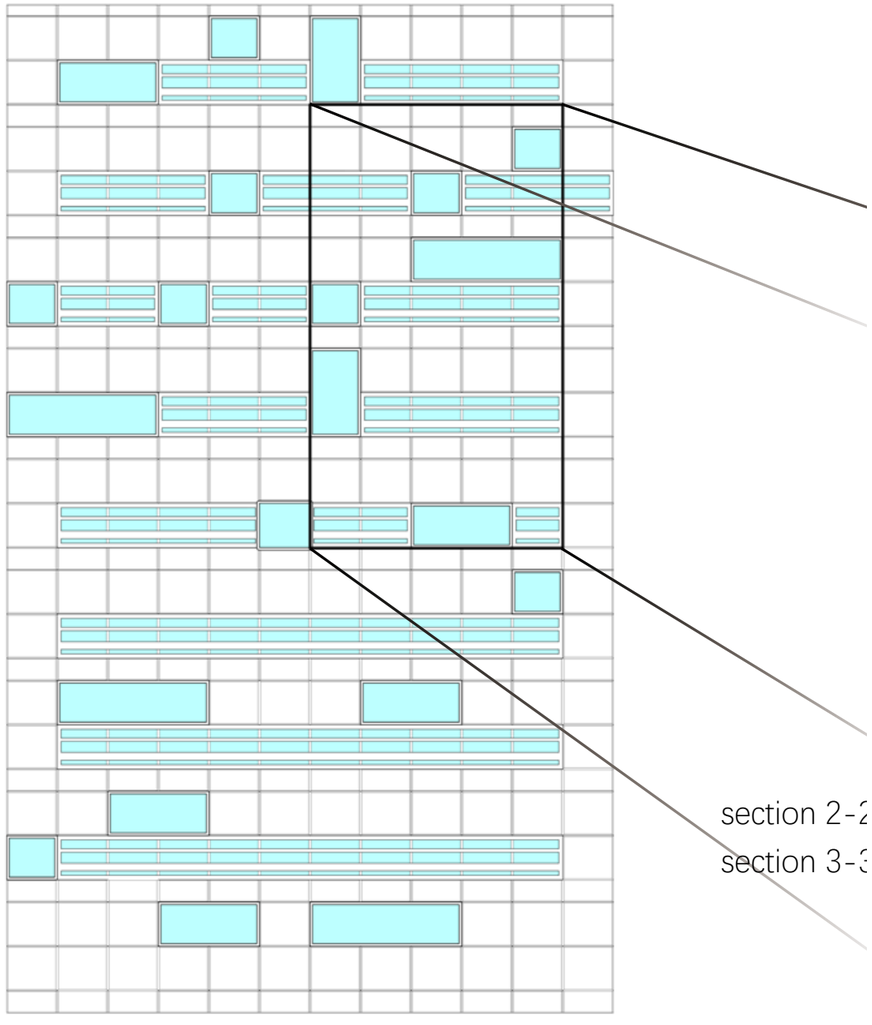
It reminds me of another theory called Space Syntax. Space Syntax is a set of techniques for analyzing spatial layouts and human activity patterns in buildings and urban areas.

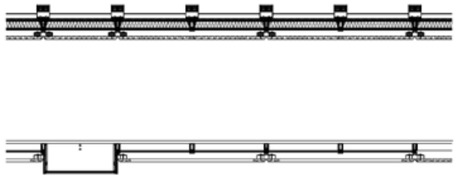


Advanced Curtain Wall



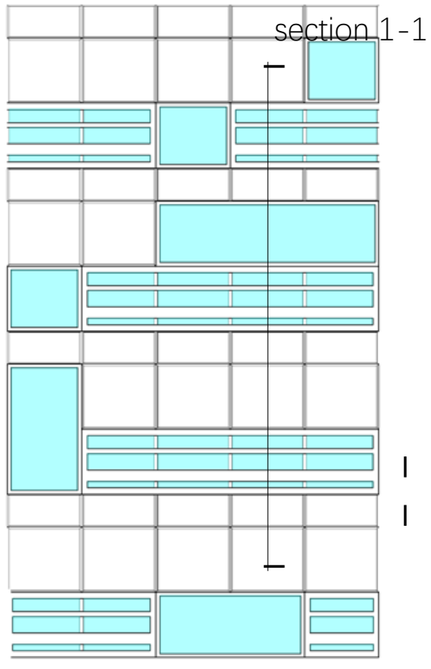






section 2-2

section 3-3



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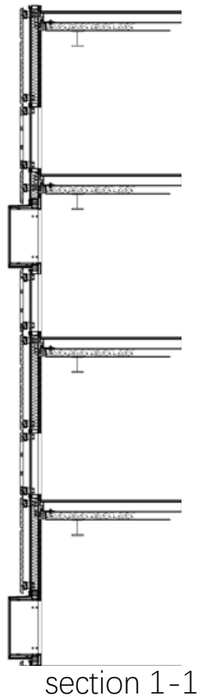

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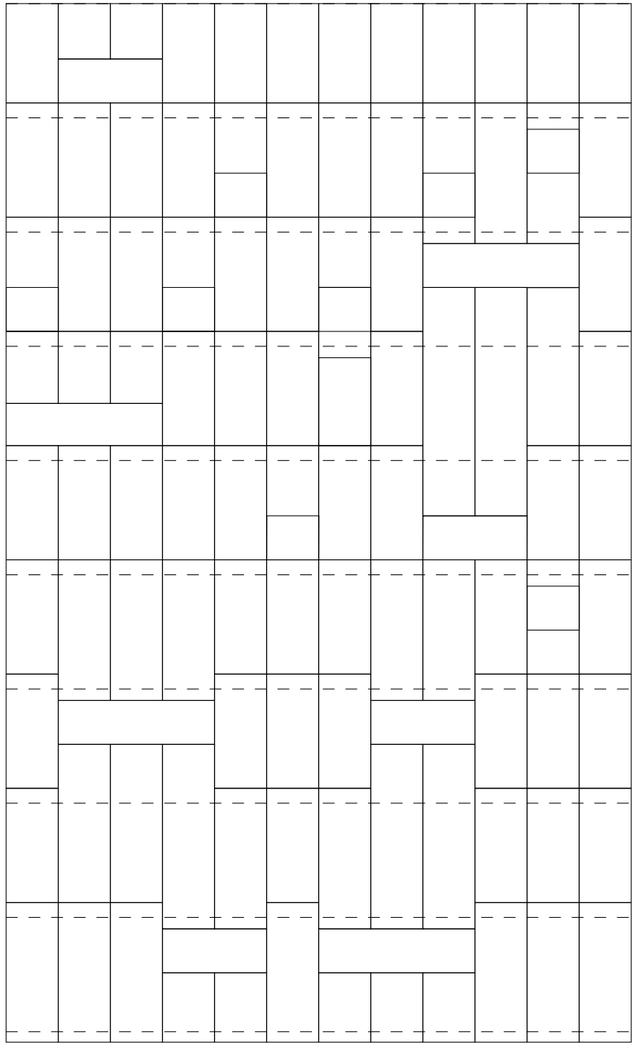
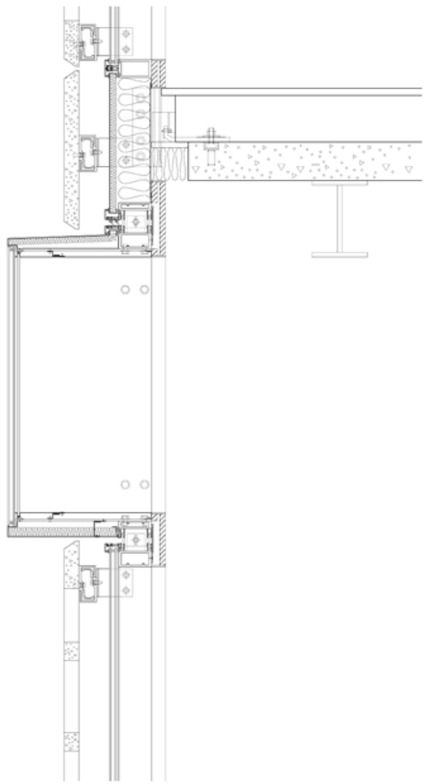
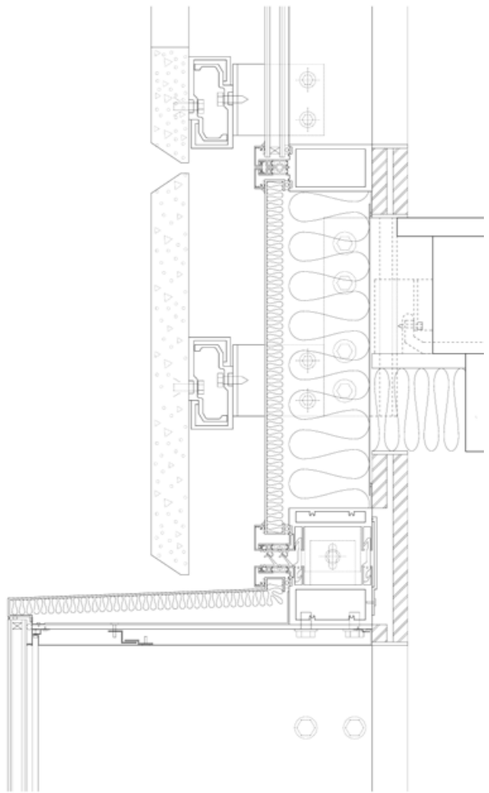
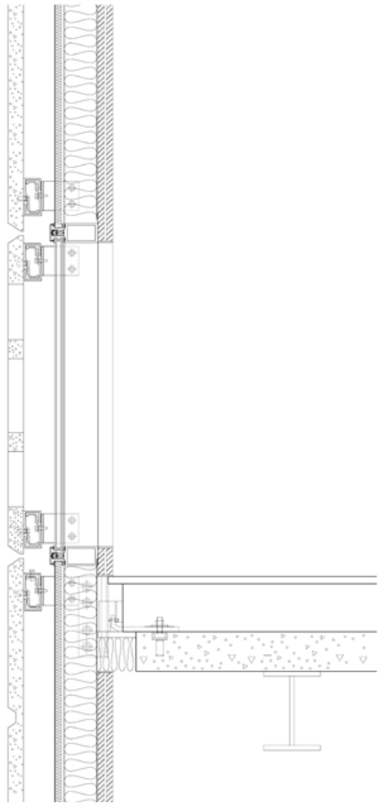
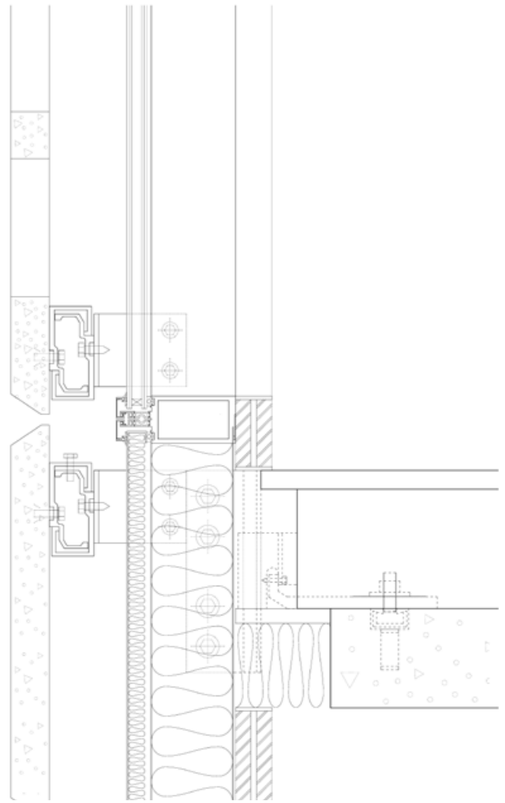
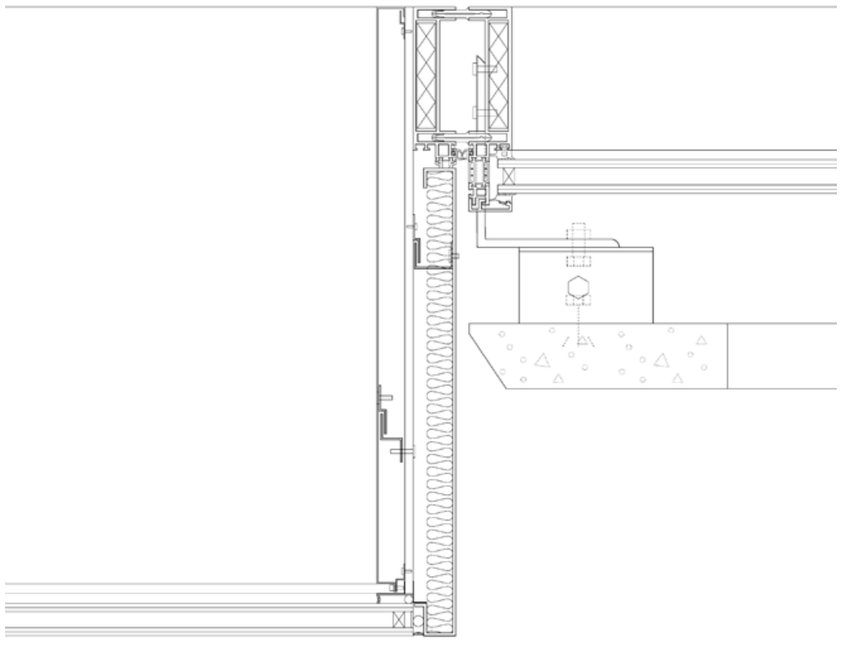


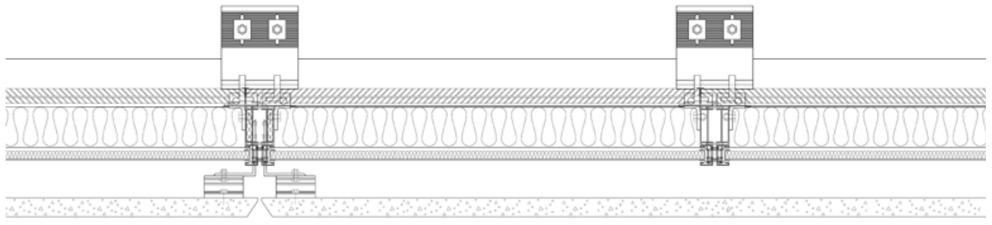


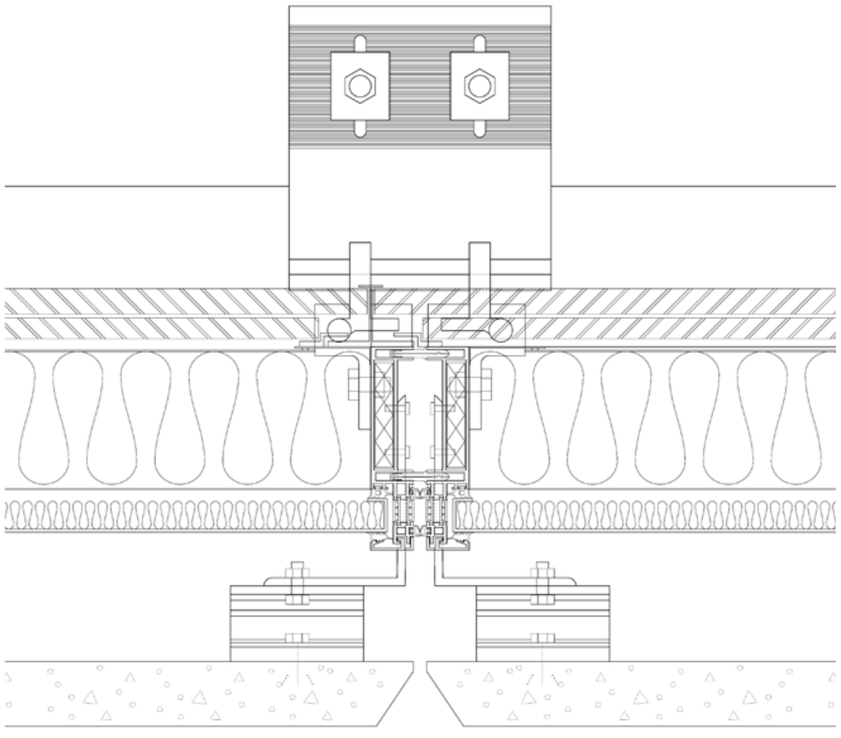




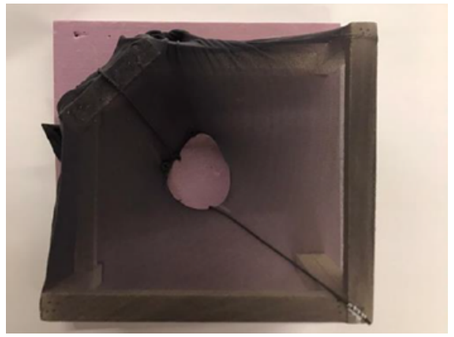


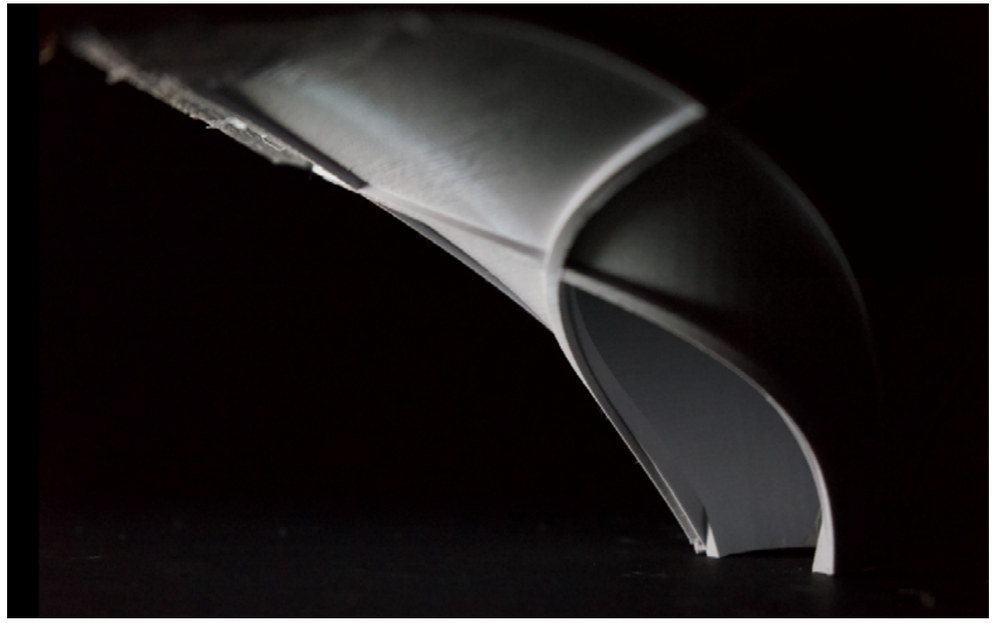


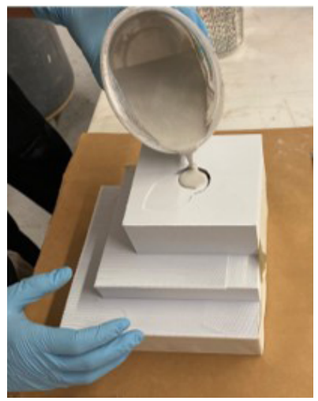


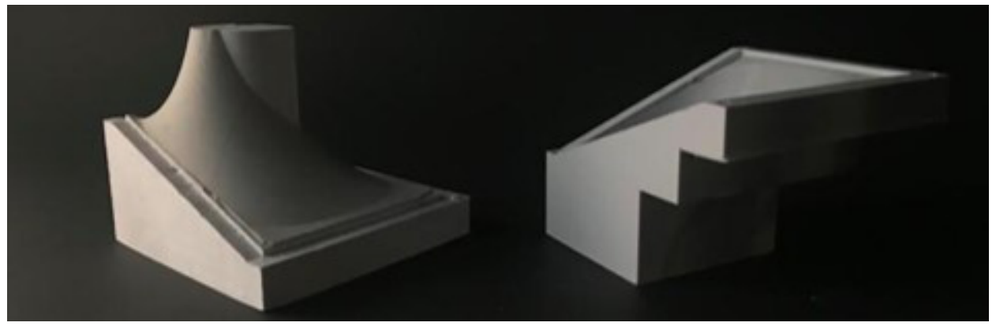


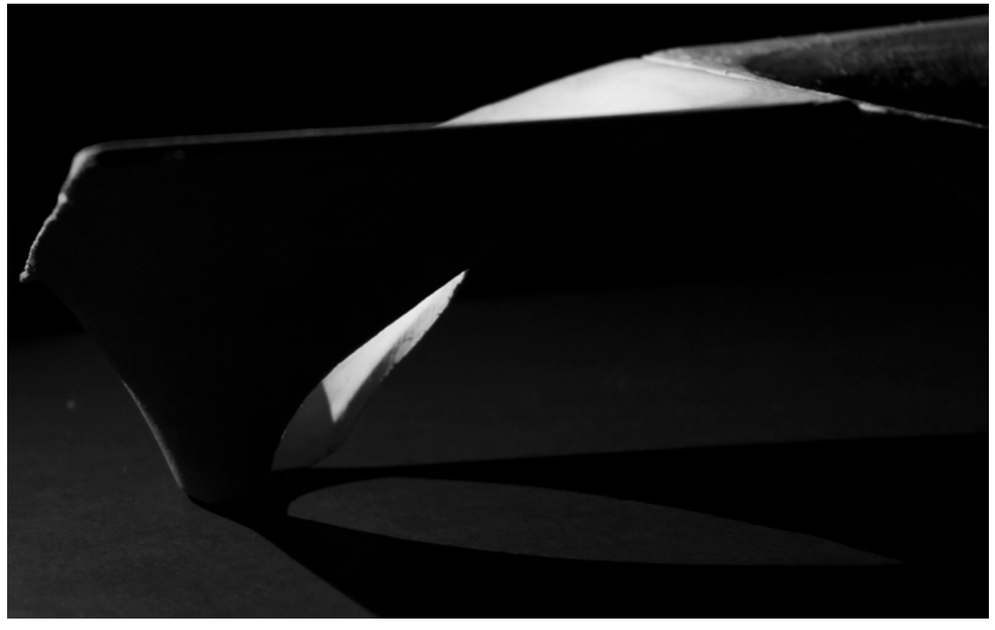
Tension & Compression Srf

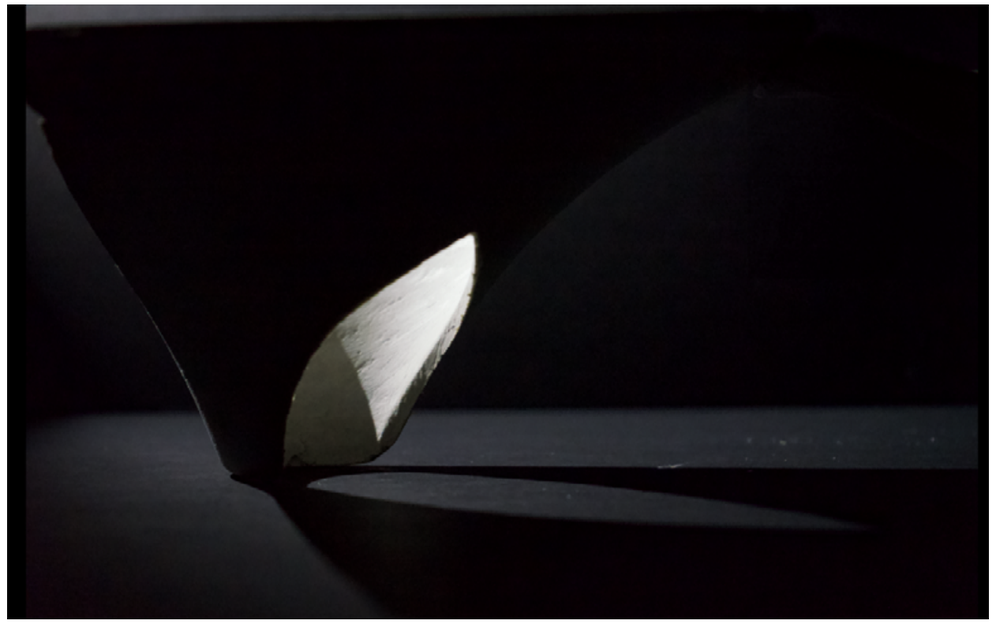












Study in Tectonic Culture

Brief Analysis on the Alvor Aalto's Selected Work

Studies in Tectonic Culture

Prof. Kenneth Frampton

Linxiaoyi Wan

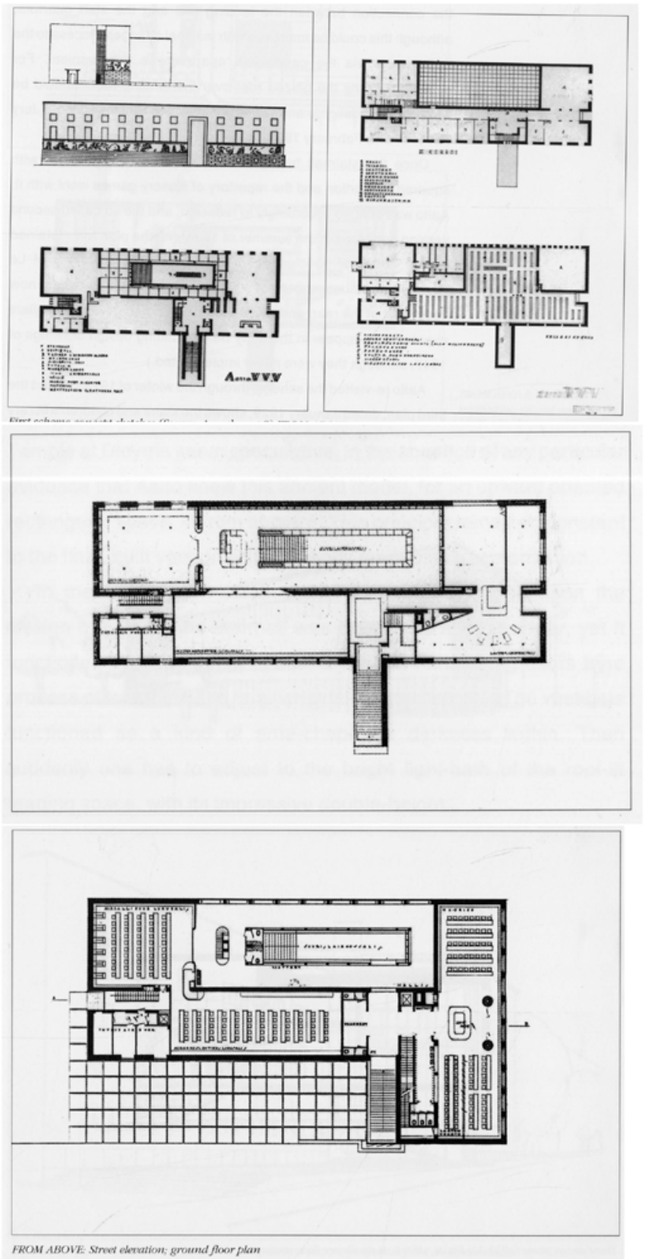
Linxiaoyi Wan lw2869 2019.12.19

Viipuri Library

Aalto went through this transition while succeeding in constantly retaining certain formal elements from the neoclassical preliminaries of 1927 to the end-product of 1935. Great historical significance of this single work, not only in the development of Aalto, but more importantly, in the growth and evolution of the modern movement beyond a rigid Functionalism, and towards a more 'user-friendly' approach.

In the first plan, Aalto's design is obviously influenced by the Nordic romantic architectural style. The proportions from the vertical long windows to the facade are very similar. At the same time, Aalto's plan is also significantly affected by Stockholm Public Library.

In the first proposal, the treatment of the foyer obscures the boundary between indoor and outdoor. The thick stone walls give a feeling of indoor space, but Aalto's treat it as an outdoor space to introduce people into the room. However, the problem with this design is that the entrance hall is too dim and lacks light. In the second version of the design, Alto made some improvements to the entrance hall design, changing a wall to glass to increase the amount of light. In the third version of the plan, he gave up the process of separating the foyer and expanded the reading space.

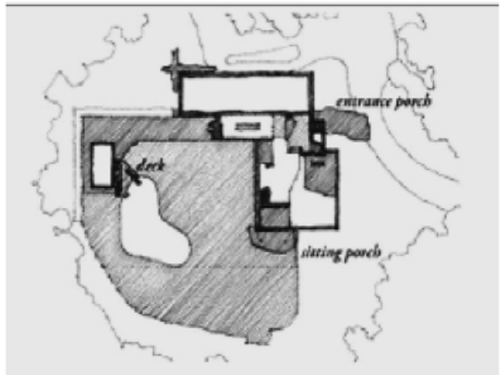


FROM ABOVE: Street elevation; ground floor plan

In the subsequent design, influenced by the international style, Aalto redesigned the whole project. He adopted round roof lighting windows in the reading room of the Viipuri library. This microphone-shaped cone opening is 1.8m deep. Sunlight reflects into the room from the inner wall. The entire reading room is filled with diffuse natural light. The artificial lighting is not directly on the table, but is reflected on the wall and reflected back. Even if you are looking for a book near the bookshelf, the shadow of the people will not cover the book to be read. This way of lighting is fitting with the cold Nordic climate. If the area of roof glass is too large, heating will consume a lot of heat in winter. In the interior design, the wavy ceiling design combines the acoustic design with the interior, making the interior space more fluid and giving auditorium a better acoustic effect.

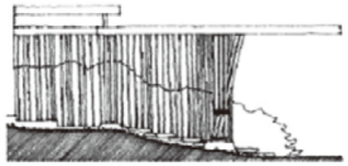
Villa Maire

Villa Maire was built by Alvar Aalto in 1939 is a significant dwelling that marks a transition from traditional to modern architecture. Built as a guest house and rural retreat for Harry and Maire Gullichsen, Aalto was given permission to experiment with his thoughts and styles, which becomes clear when studying the strangely cohesive residence.



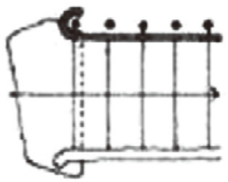
The first floor is naturally topography: trees, land, and faintly identifiable driveways. The second floor is a house with a rectangular core. Starting from the wall that separates the inside and the outside, Aalto planned both the inside and outside auxiliary spaces. Outside is a garden: the natural environment inside the park contrasts with the forest outside the garden. Above this floor are stone steps and swimming pools. The steps are attached to the sauna, and a small deck with a springboard is connected from top to bottom to show more levels. There is also a step made of irregular stones beside the house, which is hidden among the irregular porches. In the studio above the garden, a curved wall projects from a rectangular section to invite sunlight into the porch.

The details of the house have some overlapping edges. The porch of the main entrance combines regularity and irregularity.

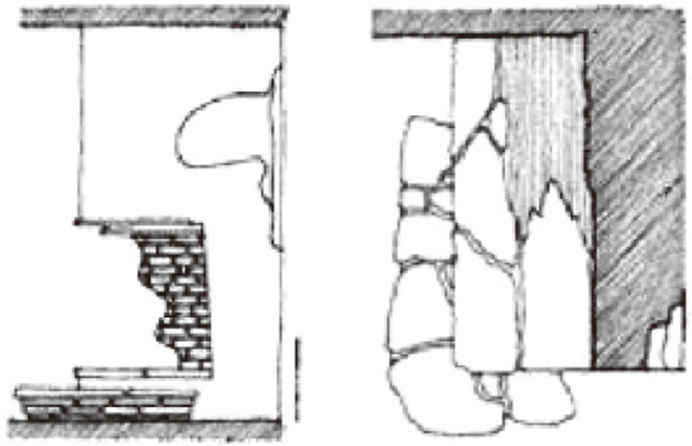


The fireplace, which is covered under the platform, is also an irregular design, which consists of some irregular stones attached to the regular dining room end wall.

The steps in the bottom of the living room is skewed, which set off the rigorous regularity of the other steps.



Breaks in the stucco wall, irregular curbs, and a strange "bite" mark protruding from the border by the window also weakened the edge of the main fireplace in the living room.



The designer even reserved a fence on the flat roof for the trail and pool scheme.

Not only this, Aalto also distinguished the columns in different rooms. The columns in different spaces use different methods, sometimes using double columns and sometimes single columns. At the same time, wrapping the leather around the iron columns makes it more temperature and makes the space more humane. At the same time, in the courtyard, by strapping wood columns, Aalto combined two single columns into one column to support the roof, while the corridor used steel frames and concrete columns to support the roof. The column changes were used to predict the space and Functional changes.

According to that Aalto was influenced by Wright's Falling Water Villas. Falling Water Villas were completed and published before Aalto began designing the Villa Maire. In the early design of the Villa Maire, there was a cantilever structure. Although there was no waterfall in the site, the design became more mature as it processed. As the analysis in some books and periodicals shows, for these two architects, many of the ideas are inspired by traditional Japanese architecture, just like the sharp boundaries that traditional Japanese temples show between

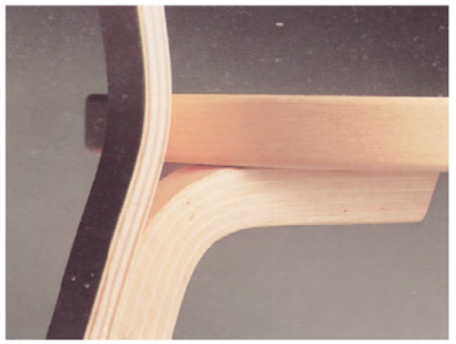
humans and nature. Just like traditional Japanese houses and gardens, the Villa Maire embodies a subtle relationship between human and nature, and even a fusion of human and nature. Since the architect still retains control, this displayed coordination is not so much a realistic aesthetic as a poetic pursuit.

The ARTEK

Artek was founded in Helsinki in 1935 by four young idealists: Alvar and Aino Aalto, Maire Gullichsen, and Nils-Gustav Hahl. Their goal was " to sell furniture and to promote a modern culture of living by exhibitions and other educational means."

Finland produce high quality wood, which is integrated into every aspect of Finnish life. Aalto's exploration of material properties has also focused on the excavation of wood properties. He invented a kind of "bent-wood furniture" to dealing with wood in Finland. The use of wood is not a manifestation of nostalgia, it is more important to make full use of the "bioorganic characteristics" of wood, that is, limited thermal conductivity, intimacy for people and their lives, and good hand feel. Aalto worked with the famous hand-made furniture manufacturer OttoKorhonen to conduct experiments similar to "Bauhaus-style" wood in order to explore the bending potential of wood and the performance of laminated wood that reflects the texture of the internal structure of wood. The emergence of wooden serpentine surfaces is a major invention of this kind of experiment, and this type of wooden surface was soon applied in the Viipuri Library.

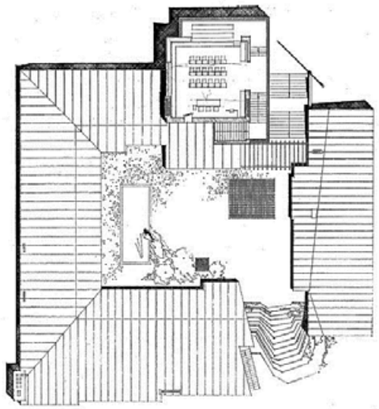
The "curved knee" is another masterpiece of Aalto's test of wood characteristics. The basic method is to cut down along the direction of the birch texture until it bends. And then bent at the correct angle. Later, Aalto developed the "Y-leg" and "fan-shaped wooden leg, Aalto called these inventions "the column's little sister." Aalto applied these inventions of wooden furniture design to architecture on a larger scale. He is obviously fascinated by the unique feeling of wood and the texture of the wood. He continued to do a lot of experiments on wood, and even made it into wood carvings, turning it into a larger-scale interior decoration.

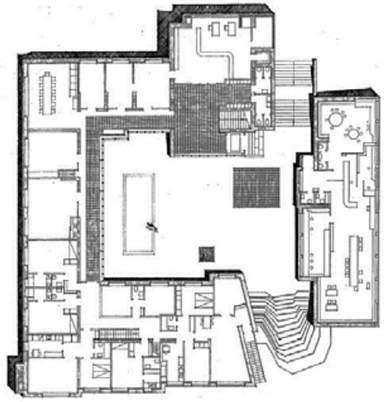


Saynatasalo Town Hall

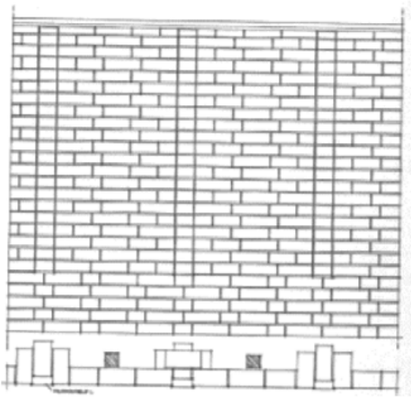
The design of the Town Hall was influenced by both Finnish vernacular architecture and the humanist Italian renaissance. It was the Italian Renaissance from which Aalto drew inspiration for the courtyard arrangement which informed the name of his original competition entry entitled "Curia." While the main program of the building is housed within a heavy brick envelope, the courtyard is bordered by a glass-enclosed circulation space which can be linked to the model of an arcade-bordered Piazza.

Saynatasalo Town Hall is mainly composed of two parts of different shape "—" and "⌊⌋" surround an inner courtyard which is higher than the ground floor. It is designed with planks and irregular mulch in the southeast and southwest of the building, respectively. The building steps connect the inner courtyard and surrounding roads, Aalto integrated the topographical features and piled the excavated soil into the inner courtyard above the basement. The west side grass step is a simulation of terrain contours, which forms a natural and artificial contrast with the granite steps on the east side, which fully reflects the respect for the base terrain. The building contains multiple functions. The "⌊⌋" shape the parliament, management agencies and dormitories for government employees; the "—" shaped section is a library for local people; Saynatasalo also provide rental space for different commercial purposes. The commercial part is open to the outside, while retaining the lower part under the dormitory; the management and cultural space faces the quiet inner courtyard.



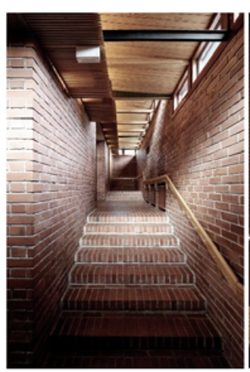


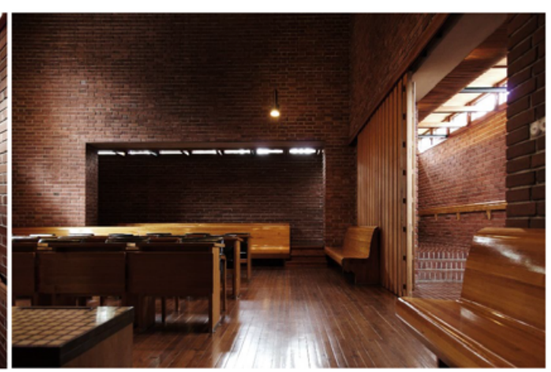
Finland is located in Northern Europe and the climate is very cold. The facade of the building is made of red bricks. The wall of the council chamber is two bricks thick, and the other parts are one and a half thick. In addition, the proportion of window openings is strictly controlled, which plays an important role in blocking cold air. There are a series of vertical grooves on the north, south, and east side of the building, which look like facade moldings. However, the use of grooves actually reflects the impact of the climate in the design. In winter, these grooves can effectively prevent the formation of frost lines. Due to the high geographic latitude, the natural light exposure time is shorter, and it is more obvious in winter.



Many details of the building reflect Aalto's treatment of light. Aalto set up a row of lighting facilities along the glass windows in the corridor around the inner courtyard. Through research on

the angle of external natural light and control of the angle of the lighting equipment, that equipment can reflect light into corridor to simulate natural light, in this way make the inner courtyard a part of the building. Long strip-shaped windows on the exterior wall of the staircase leading to the council chamber introduce natural light into room, and the light strips cast indicate the direction council chamber. The large windows on the north wall and the small windows on the west wall are installed with wooden shutters. Through diffuse reflection, light become softer and evenly. Unlike the solid exterior walls of municipal offices and conference rooms, the north and south direction of the library is more transparent. Large-scale wooden framed glass windows are used to create comfortable indoor reading spaces inviting natural light as much as possible. In addition, on the south side of library, the use of concrete inclined beams to support the roof of the pitched roof, to some extent, imprinted the modernist mark on this building.





Aalto also pay attention to humanism. The main entrance, with glass doors enclosing pine planks, makes this administrative center very intimate. Because even in the cold winter, wood never feel cold. What's more interesting is that the door handle is metal, however, wrapping with the black leather diminish the frozen feeling in winter. Inside the corridor, there is a brick bench in front of the window. The gap between the brick bench and the window reflects Aalto's careful consideration. Below the brick stool is a heating device. The warm air will spread upward along this gap and make people feel warm and cozy. As for the exterior wall material, Aalto emphasizes the rough texture of the brick. In order to avoid the feeling of dullness caused by the too strict arrangement of the bricks, he thought that there is no need to carefully select brick, and the convex and concave effects are intentionally made during construction which made the wall surface more vivid in the sunlight. The town hall is crowned by the council chamber, a double-height space which is capped by the Aalto-designed "Butterfly" trusses. The trusses support both the roof and the ceiling, creating airflow to manage condensation in the winter and heat in the summer. The butterfly truss eliminates the need for multiple intermediate trusses. It also gives call to medieval and traditional styles.

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