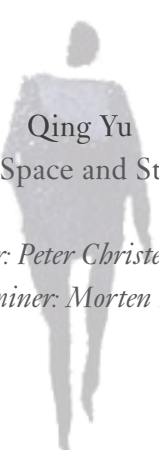


# Spatial Orientation

Touching the architectural elements by hand



Qing Yu  
Matter Space and Structure

*Tutor: Peter Christensson  
Examiner: Morten Lund*



**CHALMERS**

俞晴

*Qing Yu*

Spatial orientation

Touching the architectural elements by hand

Chalmers School of Architecture

Department of Architecture and Civil Engineering

Master program of Architecture and Urban Design

Master Thesis Spring 2019

*Tutor: Peter Christensson*

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“ *The sun and the star are how nature help  
people find the way, architectural element is  
the method buildings use to navigate human.* ”

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**I**  
INTRODUCTION

ABSTRACT  
WORKFLOW



# ABSTRACT

## AIM

As we all know, if a man loses his way in nature, he can use the star and sun to guide himself. What can we do if we lose our way in a building? In my project, touching the wall and feeling the light could be possibilities to solve this problem. I aim at designing the spatial orientation system by feeling architectural elements which are the DNA of buildings, representing the culture, history, climate and so on.

In many situations, we will lose our own ways and have no sense of direction. It is why wayfinding is very important for buildings. For example, when you enter a long corridor, if you are not at the beginning or the end, you will feel very hard to find the correct direction. The common method to navigate people's directions is by using signs, but not spatial characteristic. What I researching in my project is to help people know the direction with their body feelings and spatial features when they can not easily find the way.

Eye is the main organ we use to identify direction. However, the hand has advantages over the eye because it can observe the environment by means of touch, and having observed it, it can immediately proceed to do something about it. The hand has other great advantages over the eye. If people are in the dark space, the hand can still feel the way when the eye is invisible.

Touching the architectural elements is the starting point because it is a very common situation happened in buildings. Light and action are the influencing factors. The route people walk, they will feel the light and shadow change a little bit and their actions could also make shadow move. All events form the sequence of the orientation system in a building.

It is a pity that some architects think the orientation system is not their responsibility. The spatial orientation should be one part of architecture and belongs to the the space we stay.

## INSPIRATION

For architects, their task is "*to make visible how the world touches us*".

"Every touching experience of architecture is multi-sensory; qualities of space, matter and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle. Architecture strengthens the existential experience, one's sense of being in the world, and this is essentially a strengthened experience of self."

Architects around the world today are attempting to re-sexualize architecture through a strengthened sense of materiality and hapticity, texture and weight, the density of space and materialised light.

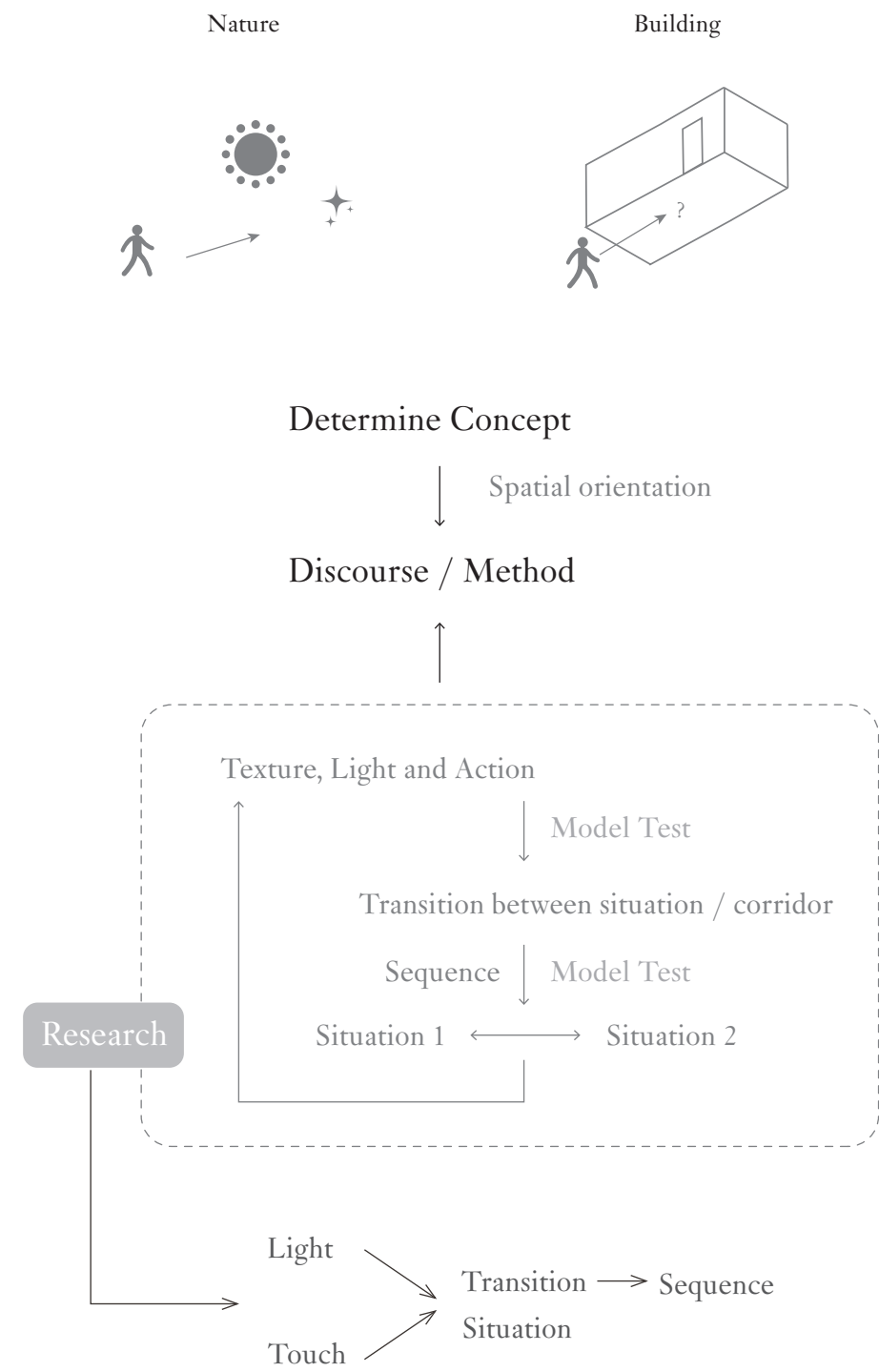
An architectural work is not experienced as a series of isolated retinal pictures; it is touched and lived in its full and integrated material, embodied and spiritual essence. A profound work is always a world and a complete microcosm. It offers pleasurable shapes and surfaces moulded for the touch of the eye, but it also incorporates and integrates physical and mental structures, giving our existential experience of being a strengthened coherence and significance. A great building enhances and articulates our understanding of gravity and materiality, horizontality and verticality, the dimensions of above and below, as well as the external enigmas of existence, light and silence.

----Juhani Pallasmaa

## KEYWORDS

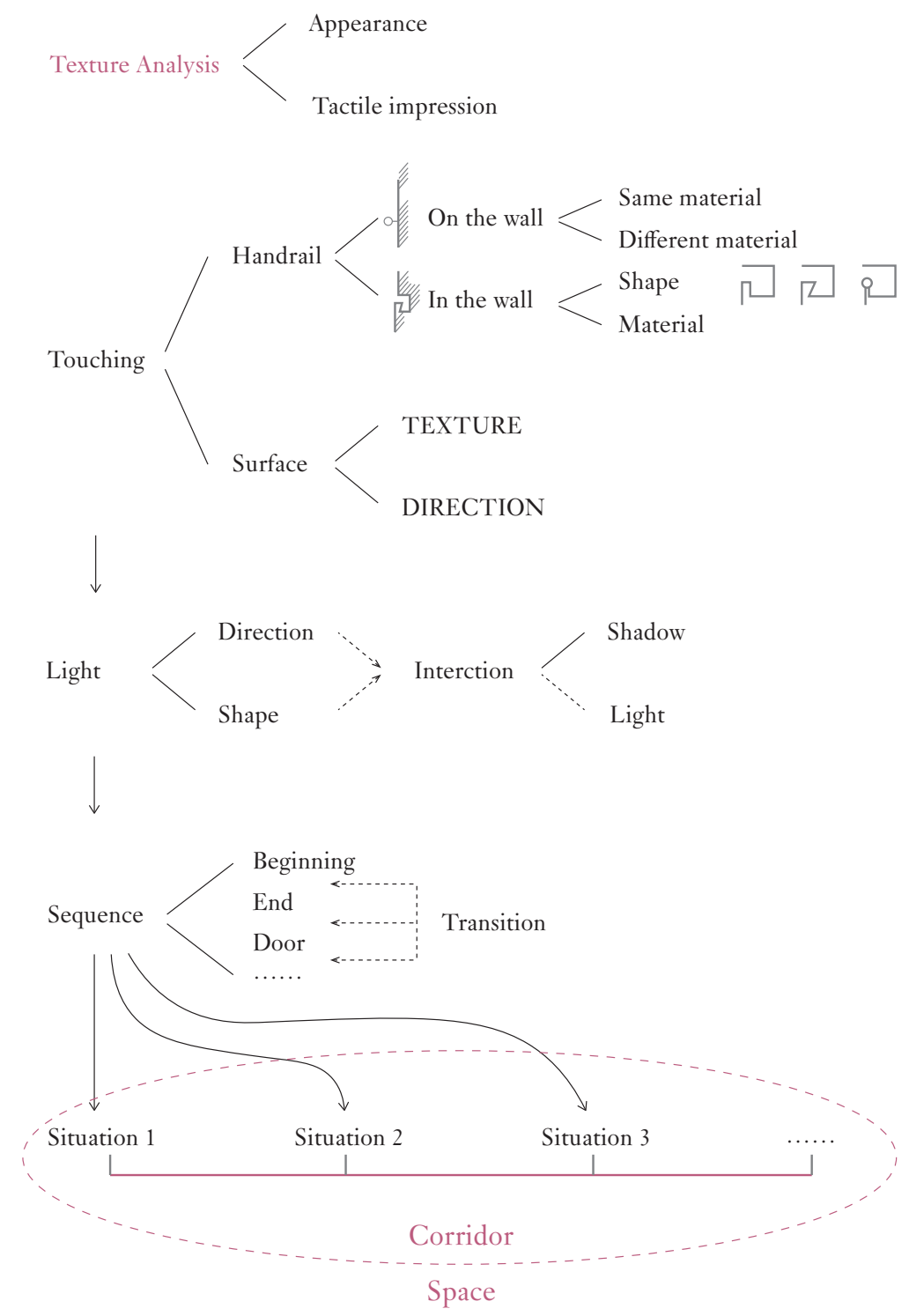
*Spatial Orientation, Texture, Light, Interaction, Touchable, Transition, Sequence, Situation*

# WORKFLOW



The content of my thesis is the research of spatial orientation. Investigation of light and touch were carried out. Then using light and touch as the transition to form the sequence of space. In addition, touch and light could be the situation happened in the space. They are activities of architecture.

# RESEARCH PART



## II CONTEXT

Discourse

Method

Texture

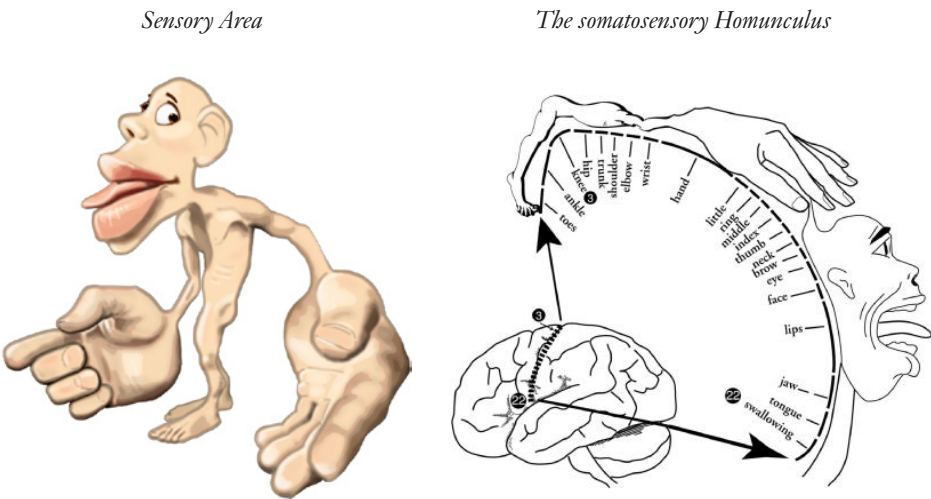
*Discourse is the communication between architects and architectures.*

LITERATURE

WHY HAND ?

From pictures, we can see that the face and hands make up a large part of sensory area compared with the torso, arms and legs. The reason is the brain maps each sensory receptor onto the cortex rather than considering the area of the body where the sensor is located. The more receptors there are in a given area of skin, the larger that area’s map will be represented on the surface of the cortex. As a result, the hand has more receptors than arms and legs. The hand is as sensitive as the brain and more sensitive than other parts of body. Which means when people want to touch or feel something, the hand will be the best choice, giving them lots of feedbacks.

Human feels things directly by eyes, but they need to use hand or leg to make actions. If one person is blind, the feeling through hand is more obvious. In conclusion, hand is the most important sensory organ for people to feel objects.

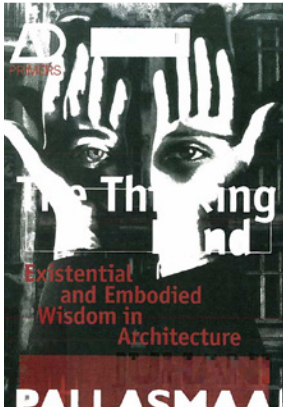
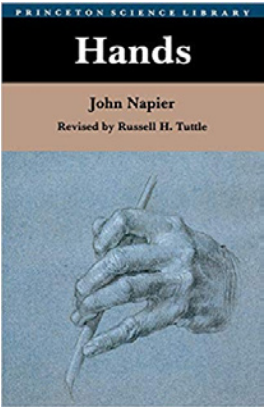


SOURCE: <https://www.brainfacts.org/~media/Brainfacts/Article%20Multimedia/Educator%20Section/Olson%20Handout.aspx>

HAND IS THE CARRIER OF TOUCHING

1. The hand has advantages over the eye because it can observe the environment by means of touch, and having observed it, it can immediately proceed to do something about it. The hand has other great advantages over the eye. It can see around corners and it can see in the dark.
2. The hands have one further important function: they are part of our communication system; and in the extent to which they are used to communicate, not only words but also emotions and ideas, our hands are unique in the animal world.
3. The hand, like the face, are prime areas for the expression of individuality.

Hands  
John Napier



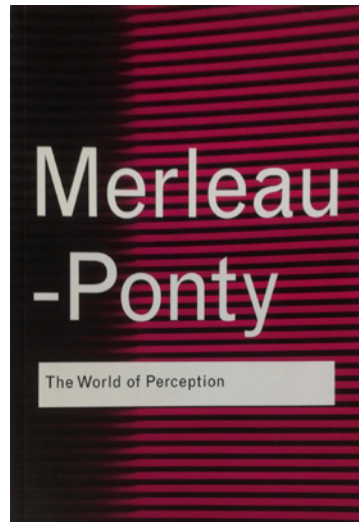
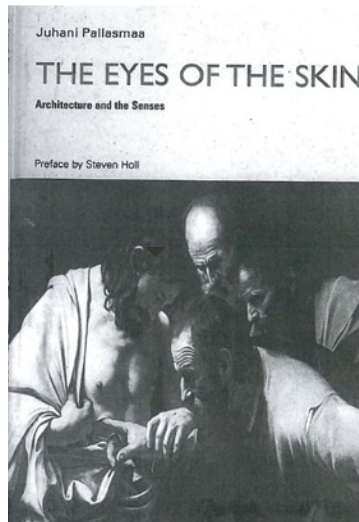
The Thinking Hand  
Juhani Pallasmaa

4. A hand is not simply part of the body, but the expression and continuation of a thought which must be captured and conveyed.  
----Honoré de Balzac
5. Architecture is also a product of the knowing hand. The hand grasps the physicality and materiality of thought and turns it into a concrete image.
6. In the arduous processes of designing, the hand often takes the lead in probing for a vision, a vague inkling that it eventually turns into a sketch, a materialisation of an idea.
7. Hands can tell epic stories of entire lives; in fact, every epoch and culture has its characteristic hands; just look at the varying hands of the countless portraits through the history of painting.

# LITERATURE

## WHY TOUCHING ?

The Eyes of The Skin / Juhani Pallasmaa



The World of Perception / Merleau Ponty

<*The Eyes of The Skin*> ---- *Juhani Pallasmaa*

All the senses, including vision, are extensions of the tactile sense; the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility.

The hands want to see, the eyes want to caress  
----Johann Wolfgang von Goethe

The sense of self, strengthened by art and architecture, allows us to engage fully in the mental dimensions of dream, imagination and desire.

The ultimate meaning of any building is beyond architecture; it directs our consciousness back to the world and towards our own sense as complete embodied and spiritual beings.

The eye is the organ of distance and separation, whereas touch is the sense of nearness, intimacy and affection. The eye surveys, controls and investigates, whereas touch approached and caresses.

<*The World of Perception*> ---- *Merleau Ponty*

The world of perception, or in other words the world which is revealed to us by our senses and in everyday life.

The unity of the object will remain a mystery for as long as we think of its various qualities (its colour and taste, for example) as just so many data belonging to the entirely distinct worlds of sight, smell, touch and so on. rather than being absolutely separate, each of these qualities has an affective meaning which establishes a correspondence between it and the qualities associated with other senses.

We do not start out in life immersed in our own self-consciousness (or even in that of things) but rather from the experience of other people. I never become aware of my own existence until I have already made contact with others; my reflection always brings me back to myself, yet for all that it owes much to my contacts with other people.

## TOUCHING IS THE WAY TO FEEL THE HEART OF ARCHITECTURE



## CASE STUDY

Venice Biennale 2014: Elements of Architecture/ Rem Koolhaas



Elements of Architecture looks under a microscope at the fundamentals of our buildings, used by any architect, anywhere, anytime: the floor, the wall, the ceiling, the roof, the door, the window, the façade, the balcony, the corridor, the fireplace, the toilet, the stair, the escalator, the elevator, the ramp. The exhibition is a selection of the most revealing, surprising, and unknown moments from a new book, Elements of Architecture, that reconstructs the global history of each element. It brings together ancient, past, current, and future versions of the elements in rooms that are each dedicated to a single element. Architecture is a profession trained to put things together, not to take them apart.

Just as science has recently shown that all of us carry “inner” Neanderthal genes, *each architectural element carries long strands of junk DNA that dates from time immemorial.*

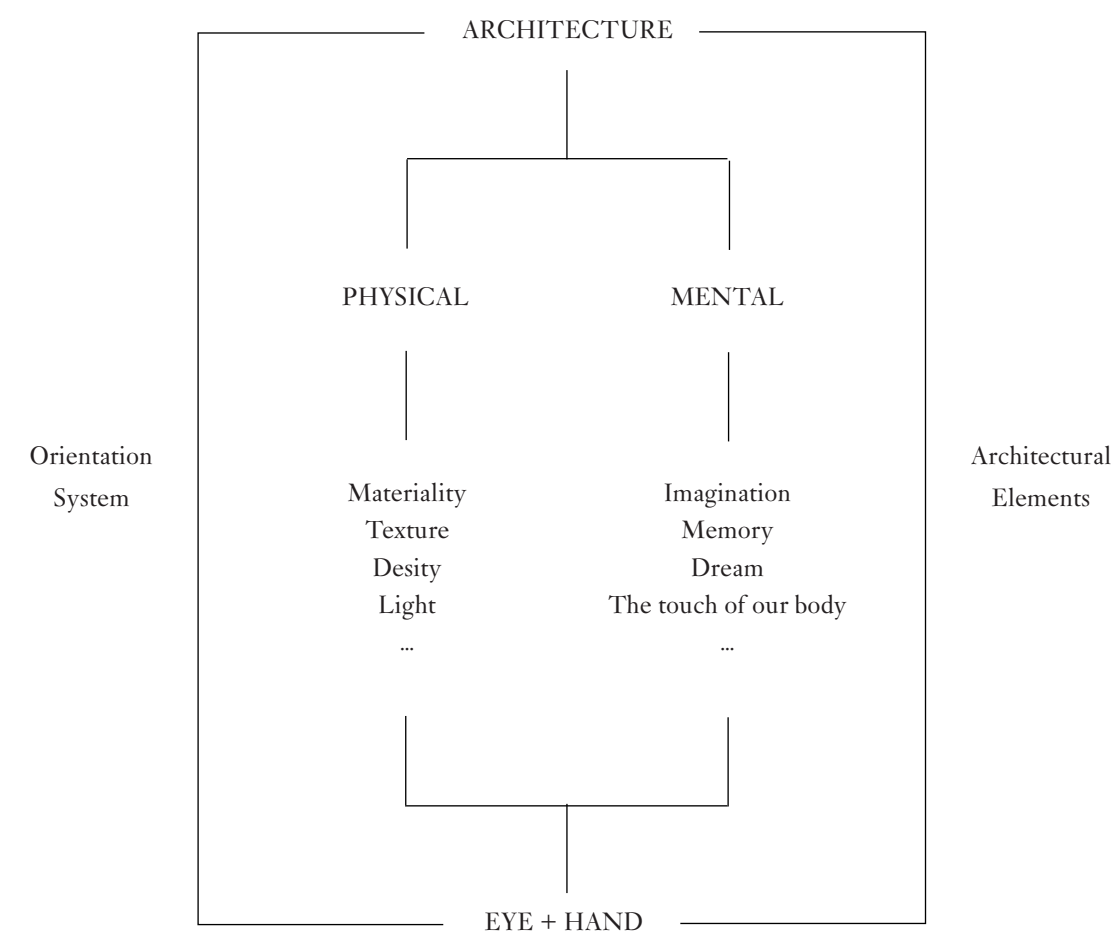
The fact that elements change independently of each other, according to different cycles and economies, and for different reasons, turns each building into a complex collage of the archaic and the current, the unique and the standard, of mechanical smoothness and bricolage. Only by looking at the elements of architecture under a microscope can we recognize the cultural preferences, forgotten symbolism, technological advances, mutations triggered by intensifying global exchange, climatic adaptations, political calculations, regulatory requirements, new digital regimes, and, somewhere in the mix, the ideas of the architect that constitute the practice of architecture today.

At the point where the 21st century is beginning to reveal some of its likely essences, *the exhibition reconstructs, in stories, fables, anecdotes, scripts, inventories, how the 15 major elements of architecture evolved across different cultures, where and when they collided with modernity, and how they are starting to mutate in the digital age, delivering drastically improved levels of control to feed an obsessive need for security and comfort.*

SOURCE: <https://oma.eu/projects/elements-of-architecture>

## ELEMENTS

CONTEXT OVERVIEW



Architecture has two characteristics, physical and mental. It is a collaboration of Materiality, Texture, Density, Light and so on. Those features we can know from our eyes and brains. However, it should provide a domicile for the touch of our bodies, memories and dreams. It also should be the bridge connecting imagination and reality.

The eye and the hand constantly collaborate, the eye carries the hand to a great distance, and the hand informs the eye at the intimate scale.

A great number of elements consist of an architecture. People's minds form a building through those elements with their bodies. The eye builds its structure and the hand touches its soul. The soul makes each architecture become unique. Through these specialities, people can distinguish different spaces, navigating themselves.

## II

*Architects use methods to make their designs come ture.*

Discourse

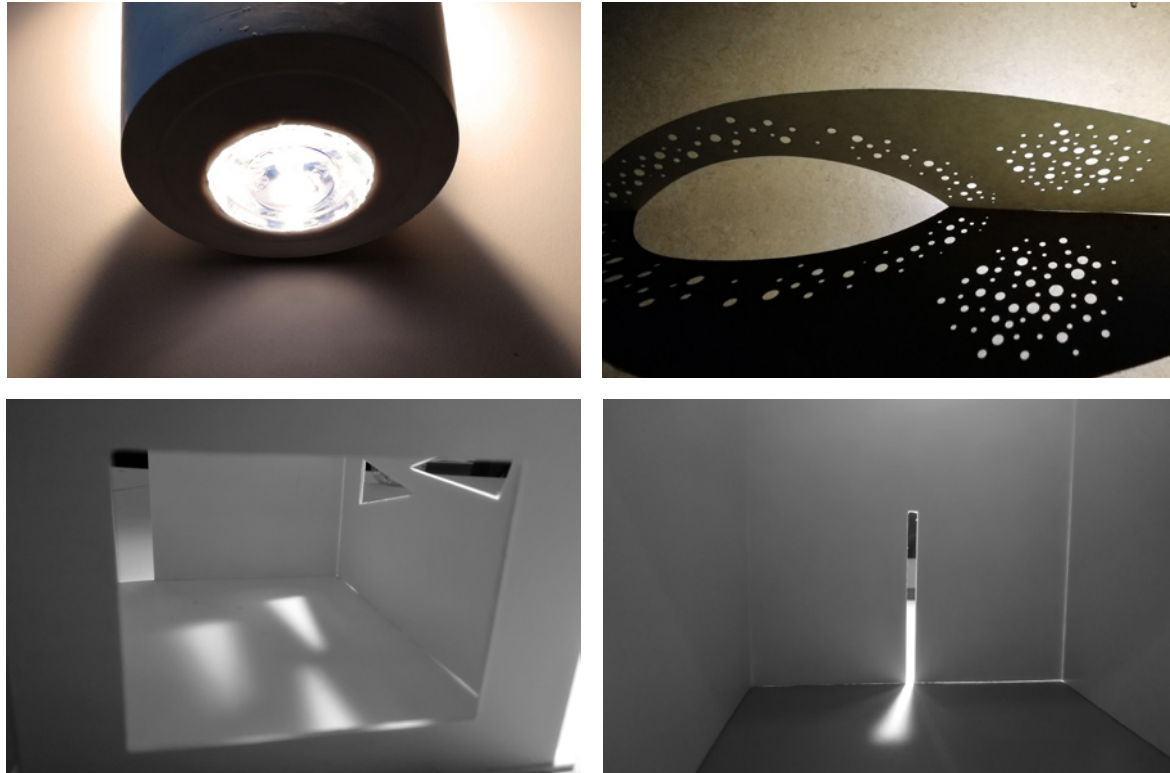
Method

Texture



## PHYSICAL MODEL

Light test



Space test

An idea is most plainly expressed by a physical model. Unlike abstract architectural drawings which take some skill to decipher, a physical model is direct. It is, therefore, the most clear and concise way to understand a project. By building a physical model, an architect can test the strengths and limitations of a space. Because physical models interact with the user directly, they are a dynamic means of communication by which both the architect and the user can realize the scope of a project.

Building a physical model is an indispensable learning tool. Before a model becomes a scaled example of the final product, it is a progression of many iterations. It is intuitive and free forming play that takes different materials and establishes an understanding of their capacity. It tests the elasticity of a space. Through the prototyping nature of model building, the architect can work through an idea and establish the order by which that idea can be realized. All phases of the design process benefit from the feedback of a physical model. From the basic layout of a space to the specification of more complex details, physical models show the user how a space works.

*A model is a comprehensive way of realizing a project because it is the most direct way that an architect can bring the process of creating place out of material and space directly into the hands of the user.*

**TESTSOURCE:** <https://www.msbatchitects.com/why-physical-models/>

## VISITING

Interior space



Exterior space

If architects only design projects in the company, they can not build so many amazing buildings in the world. Definitely, designers can get inspiration from books and website, but those have already been created by someone. If you want to create a totally unique project, you need to feel the world and touch the moment you are interested in. Architecture provides the shelter for people, it is the place where our lives start and end.

In the past time, I visited some public buildings in Gothenburg to get the feeling of texture and saw how architects used them. For example, the concrete can be smooth or rough or mixed.

The natural environment left my footprint as well. I have visited some parks and forests in Gothenburg. I knew the original appearance of the material that I am planning to use.

*If you want to design life, you need to experience it firstly.*

## II

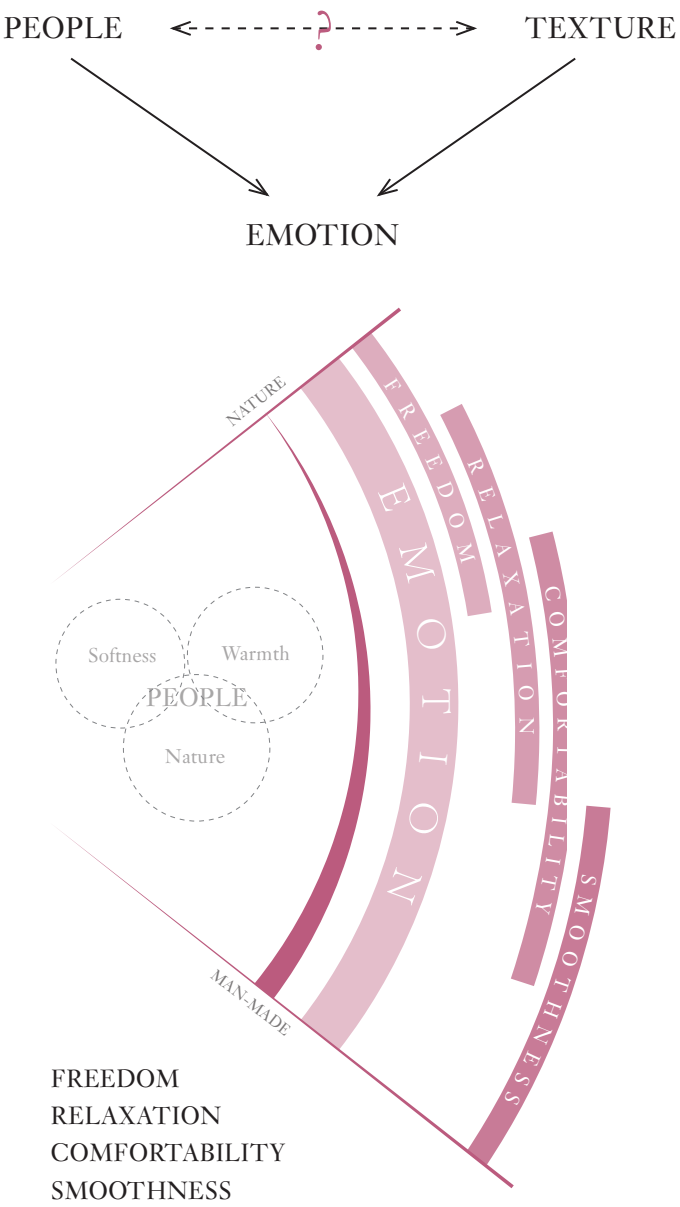
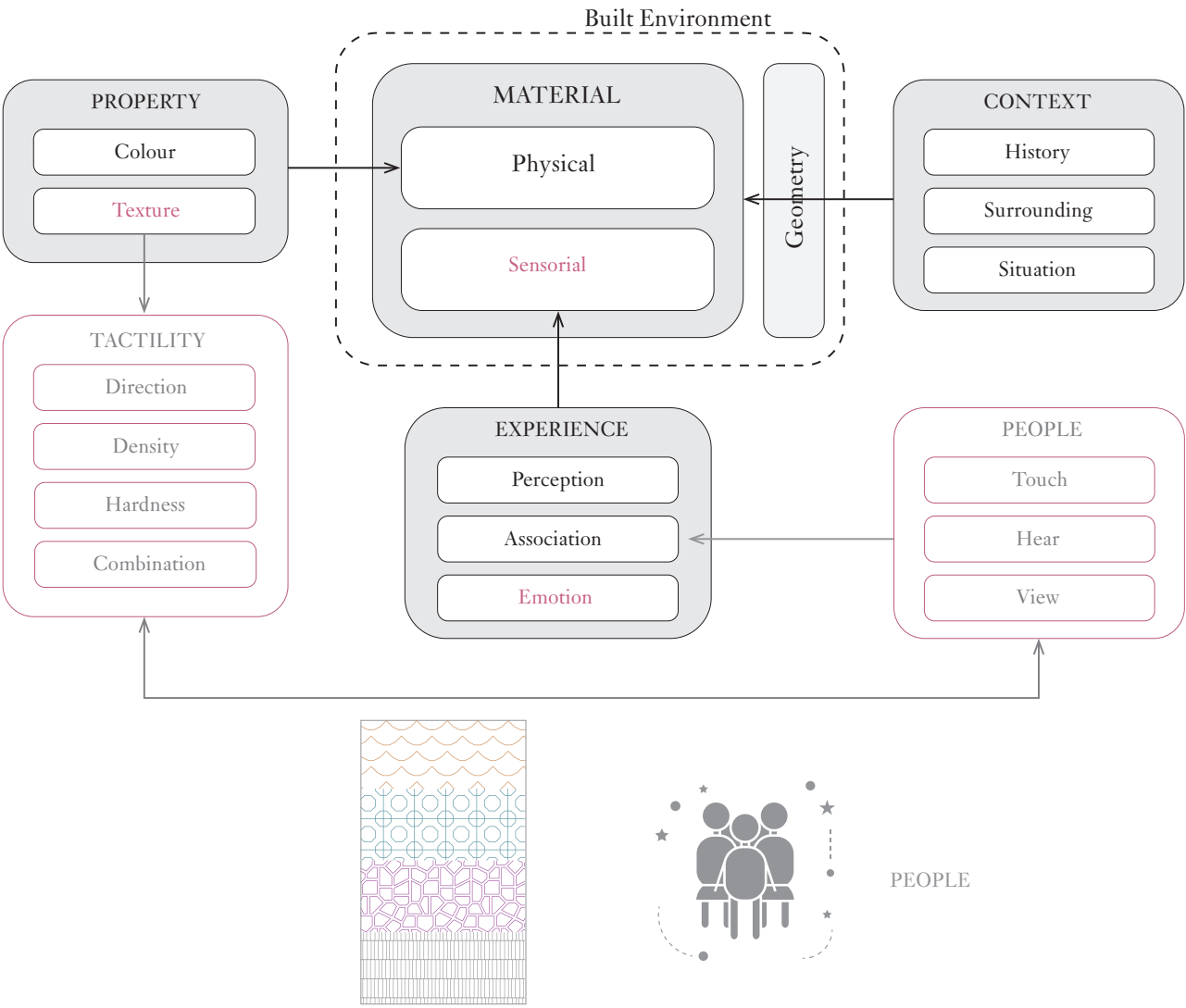
*All the senses, including vision, are extensions of the tactile sense; the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility.*

Discourse

Method

Texture

RELATION



Texture is one of the physical properties of material and personal emotion is one of the sensorial features of material. Those two characteristics are the most important parts of material. Material is a direct way that architects explain their concepts. It is the reason why I want to find out the relationship between texture and emotion.



## FEELING TEXTURE

Gothenburg City Library



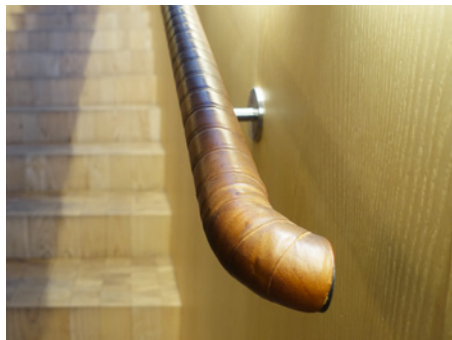
### *Sag Leather*

The handrail in Gothenburg City Library is covered by leather. The leather is wrapped around the pipe to form a continuous texture. When I held the armrest, I felt the warmth and the softness of leather. Moreover, the gap between leather give me the feeling of distance.



### *Protruding Leather*

The door handle is also covered by leather, but it has protruding texture on the surface. It is easier for users to hold. Compared to the sag one, this has a stronger feeling. It means that we could feel the difference clearly when we touch.



### *Leather Circular End*

The end of the handle is also covered by leather, but it has a circular shape to avoid hurting our skins. Actually, this material is very suitable for senior people. The elderly are more vulnerable than young people.



### *Wood*

When I saw the curve of wood, I though its surface should be rough. However, it was smooth and Istill could feel the curve. The feeling was very slight, but it was very easy to see the texture line.

After visiting, I found that handrail was the most touchable architectural elements in the buildings. We touch it when we are in the staircase; we touch it when we are the edge of the floor; we touch it when we need something to hold ourselves.

Gothenburg City Library



### *Rough Brick*

The surface of the brick is touched like the concrete. You might hurt your hand if you touch hard. This surface is not smooth and always used as exterior wall material, but the designer used it as the interior wall ingeniously.



### *Painted Wood*

Actully, the painted wood did not look like wood from a distance. However, when I touched I could feel the wood texture and temperature. This method release color restrictions.



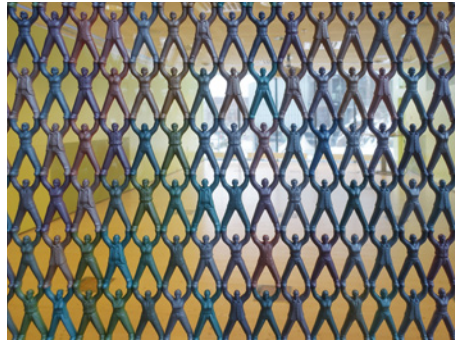
### *Painted wood + Raw Wood*

The painted wood put together with raw wood attract people's attention. In this situation, it showed that it was the last step or the first step of the staircase. Attention!



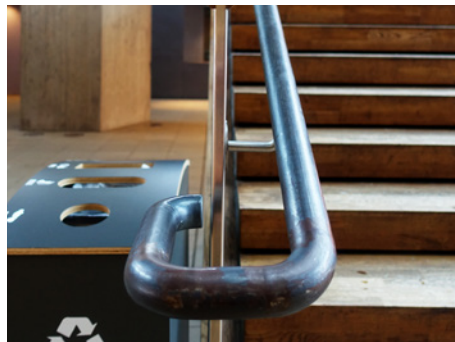
### *Marble*

The pattern of marble is very beautiful and unique. It is a nice artistic painting for the eye. Touch feeling is smooth and cold.



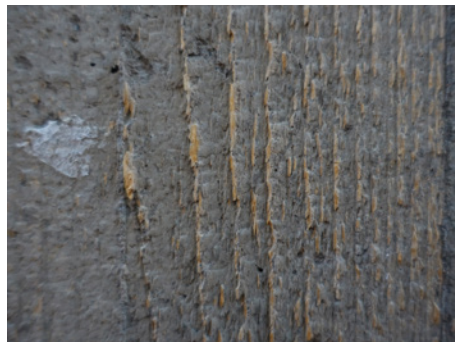
### *Plastic*

This wall is more fragile than other walls. The touching feeling of plastic is very obvious and the shape of people is pretty unique.



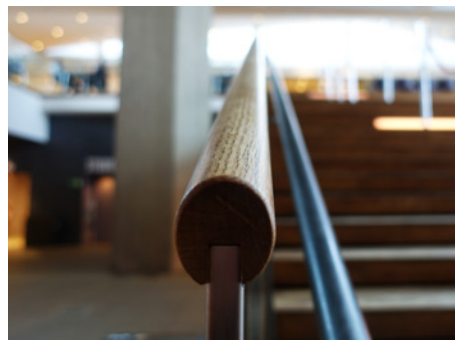
### *Metal*

The main difference between metal and wood is the temperature. Even if it was cold, the temperature difference between wood and body is not too big, but it became bigger when you touch the metal. It will be nice during summer time.



### *Concrete + Wood*

It mixed wood and concrete. When I look at it from a distance, it is like concrete. When I touch it, it feels like wood. I am not sure if the main body is concrete and the surface is wood or the main body is wood and surface is concrete.



### *Light wood*

This wooden handrail has a different texture line as the others. Those lines are almost straight, they give you a feeling of continuation. Smoother than others.



### *Painted Concrete*

Raw concrete and painted concrete give people different feelings, even if you put them together, the painted one could be looked like metal. The touch feelings are also different, but the difference is very small, just the painted one is smoother.



### *Rough concrete + Gap*

It is very interesting to have the gap on the surface of the same material. To some extent, the gap can show the direction of the way. Seeing or touching, you can know the right way and where you go.



### *Rough + Smooth concrete*

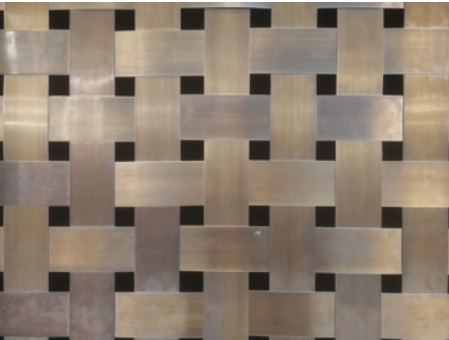
The gap between two different texture surfaces could tell people that you are changing the way and be careful. My hand and eyes give me a signal before I take next step.



### *Concrete*

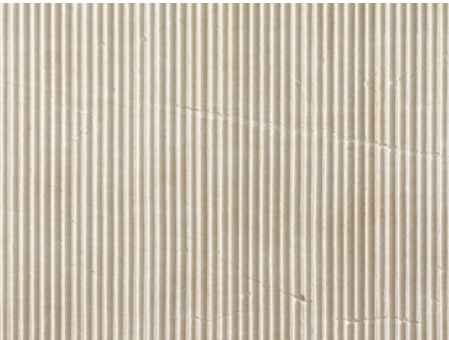
Rough concrete. When the surface is under sun, the touch feeling is so warm. However, the part on the shadow is very cold. Just like the sense we feel of cold and warm color.





*Oxidized Brass*

The shimmering weave of oxidized brass is the material for the facade of the elevator . The touching feeling is cold, smooth and hard.



*Linear Concrete*

The roughness of the concrete surface. The touching feeling of protruding straight line is very obvious. Your hand could follow the trend of line.



*Brick + Ceramic tile*

The contrast between brick and ceramic tile is the connection between the past time and the modern time. The corridor shows the sense of ancient time and the vitality of modern life.



*Marble*

This photo is a part of a marble lion and it is the texture of hair. When I touched it without seeing, I could feel the trend of texture's direction. It gave me the inspiration to have nicks on the surface to highlight the tactile appeal.

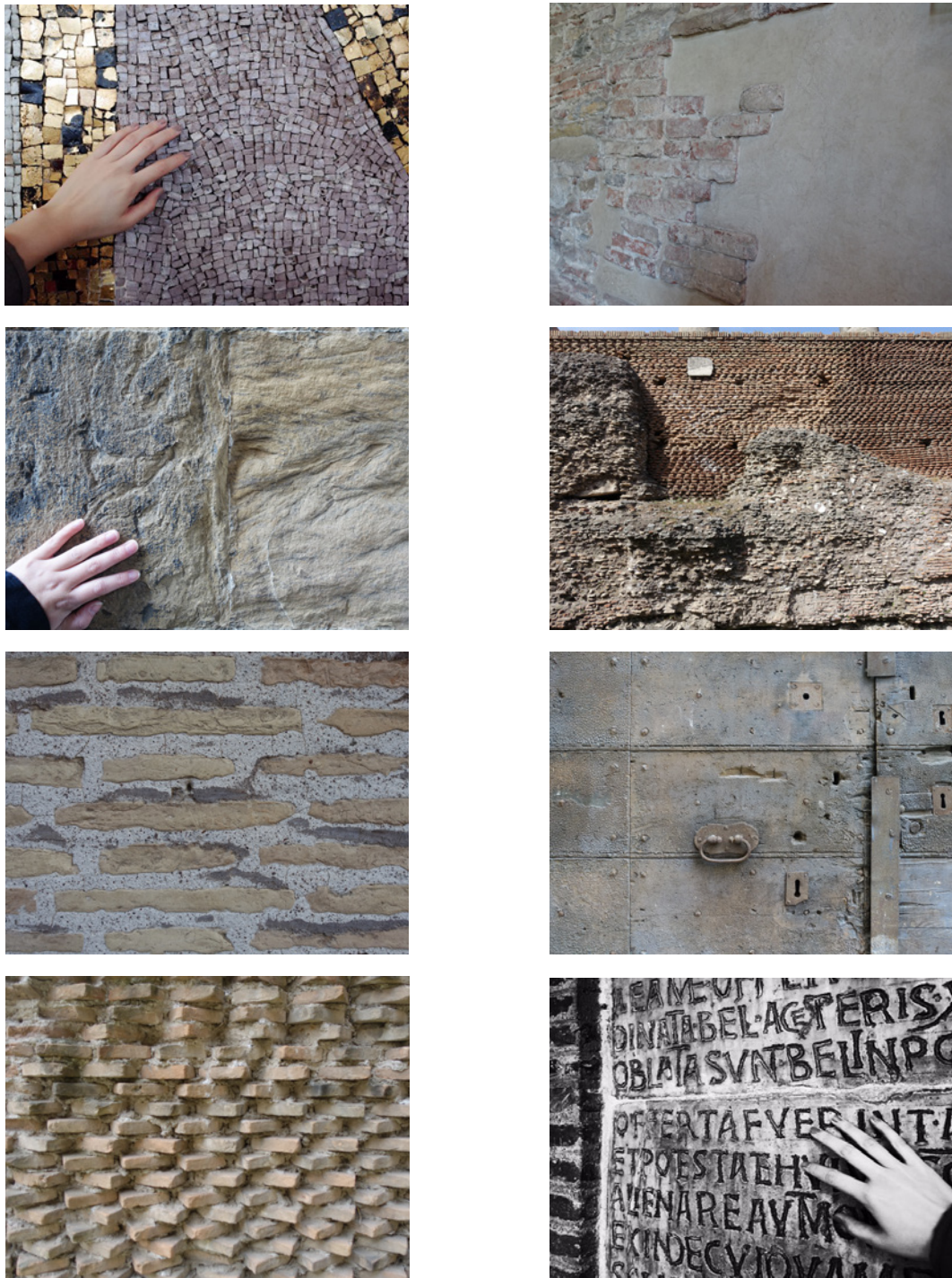
SUMMARY

CATEGORY	CHARACTERISTIC
Leather	Soft, warm, smooth, attracting people's attention perfect for winter, unique, friendly
Wood	Warm, natural, environment-friendly, color-friendly home-like feeling
Concrete	Rough or smooth, hard, cold, easy to mold could be painted with various colors
Metal	Cold, smooth, hard, light perfect for summer
Plastic	Unique, warm, smooth, colorful Combine with other materials
Marble	Cold, smooth, hard, heavy various color patterns
Brick	Heavy, sense of history, square, rough keeping memory
Ceramic tile	Smooth, reflective, cold, hard various shapes and patterns



ITALY STUDY TRIP

The study trip to explore ancient and modern materials.



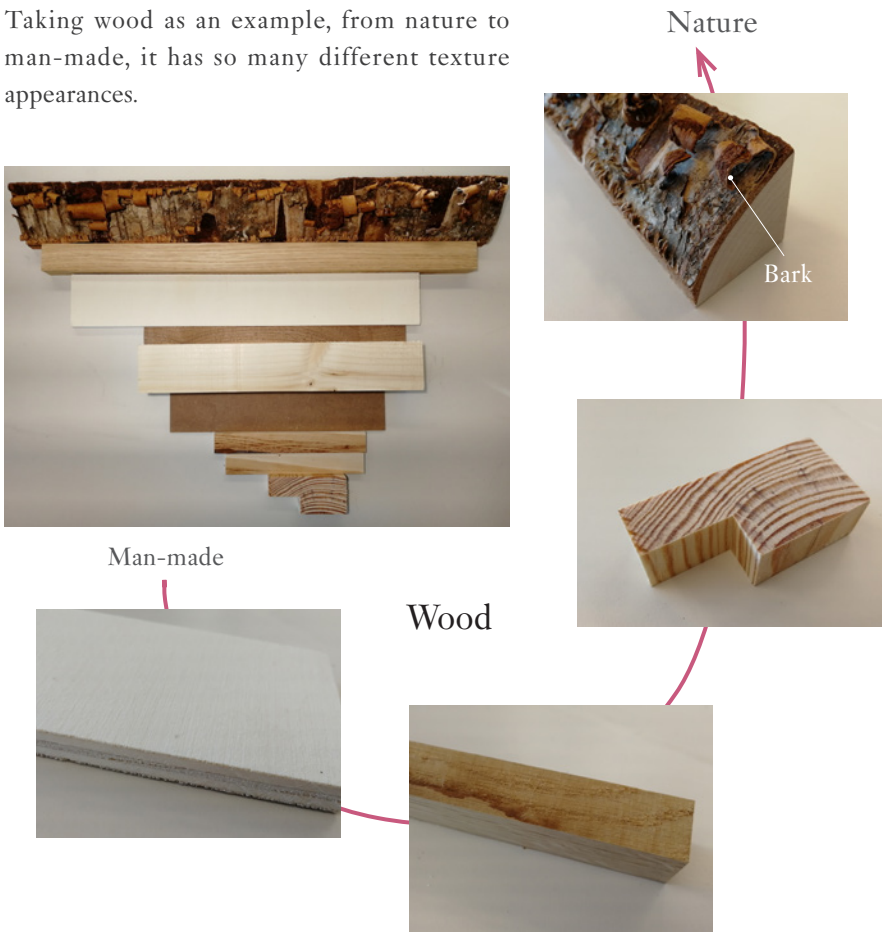
The poet from old time to the future.





TEXTURE

Taking wood as an example, from nature to man-made, it has so many different texture appearances.



SMALL PIECE FROM WOOD



When I went deeply into the material, I found that even if the large trees were sliced into small piece, it could still be a useful material. Numerous small pieces can build up to be a big enough piece.



TEXTURE MAP WALKING



When you walk in my project, it is like a texture journey and you can touch the surface to know the direction, navigating yourselves.



**III**  
RESEARCH

Touching

Light

Interaction

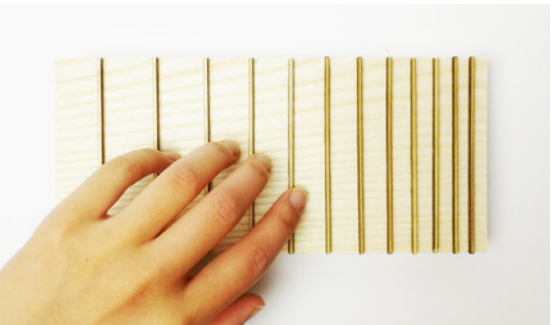
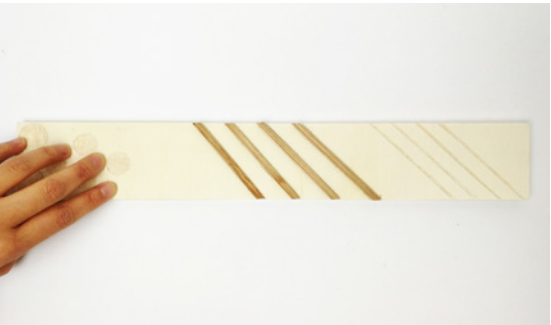
Transition

Sequence

Situation

*To touch the soul of architecture.*

# EXPERIMENT



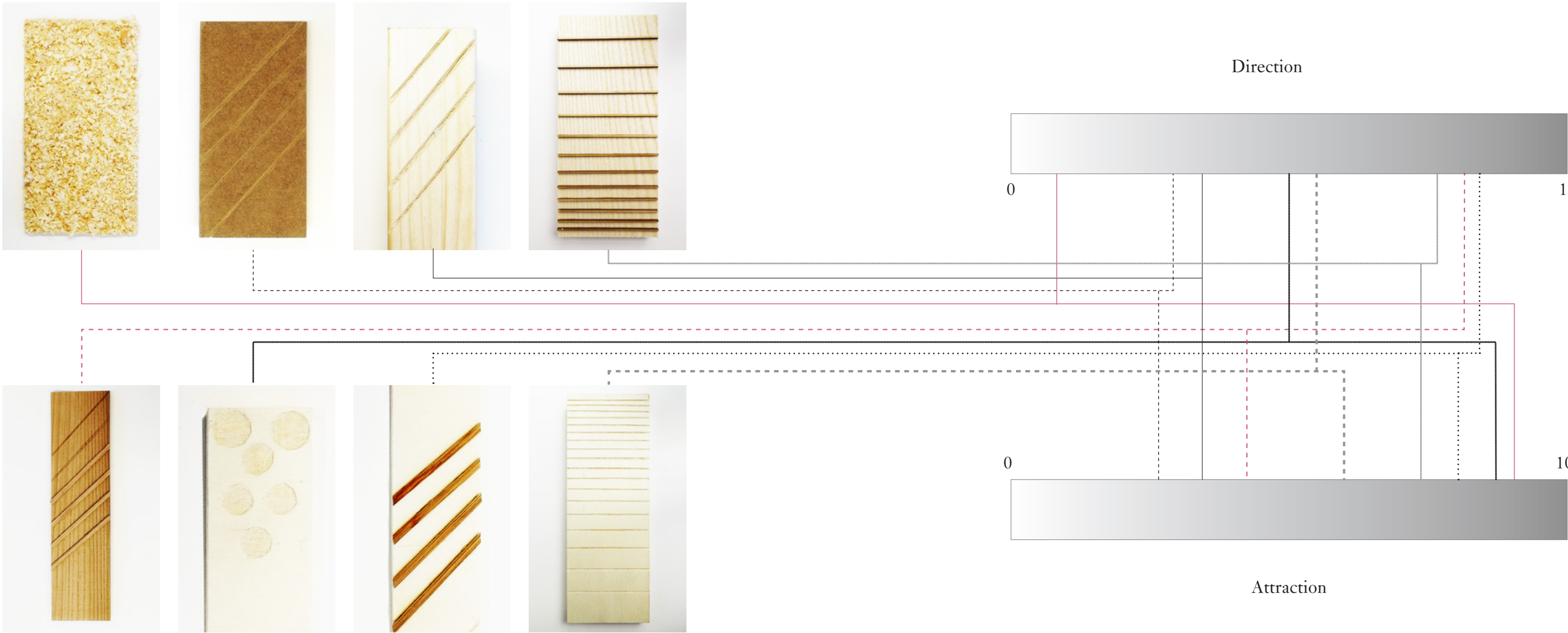
Me: I made six different texture models, can you touch it and tell me your feelings? Which one do you like best? Dose it can tell the way when you touch? What improvement can I do?

- 1: They all look interesting. The sawdust one attracts me a lot. (touching) It is soft, I like it very much, but I did not get any information about direction. The bubble one is so cute~~ Seeing those diagonal line, I can clearly know the way. When I touch it, I think the protruding one navigate me obviously. However, it gave me a sharp feeling, the straight one is more gentel.
- 2: The touching feelings are so different! But I like the diagonal cutting one, it is more smooth, compared with the protruding one. The straight cutting one is not so obvious.
- 3: I prefer the bright color wood, it give me a pure feeling. In Sweden, it is very dark during Winter, if the color of material is bright, people will feel better. I like the way you combine bright material with dark material. The bright color one is the main part, the dark one give me information. For me, the protruding and different color one is the best way to guide not matter when I touch or see.
- 4: How did you do this one? It is so soft, I like it very much. It is very interesting actually. However, it cannot tell anything about direction. I think if you cut some part of the surface, it might give some related information. People always are not aware of the importance of the wayfinding of buildings. Your master thesis could provide creative ideas of orientation system.
- 5. Touching them like a game! The diagonal line is square, the feeling is not so nice if I move quickly. However, this one is still the most obvious way not only from eyes, but also from hand.
- 6. For me, the touching feeling of people is different. I think the protruding one with different material is the most obvious one, but I prefer the more creative way. The bubble one could be developed into a deeper level. It has the possibility to navigate people.

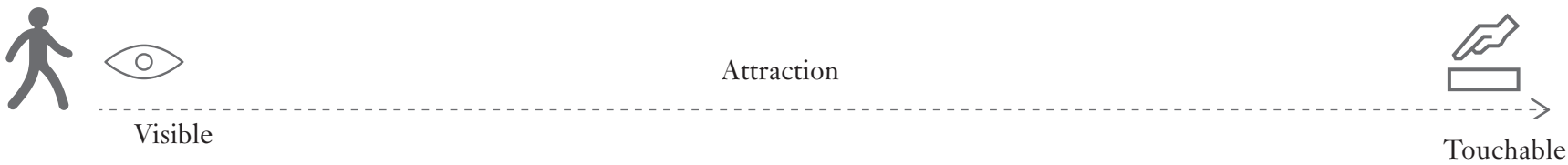


TEXTURE FEELING

After interviews, I tried to figure out the level of feeling direction and attraction through their words.



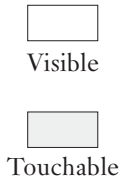
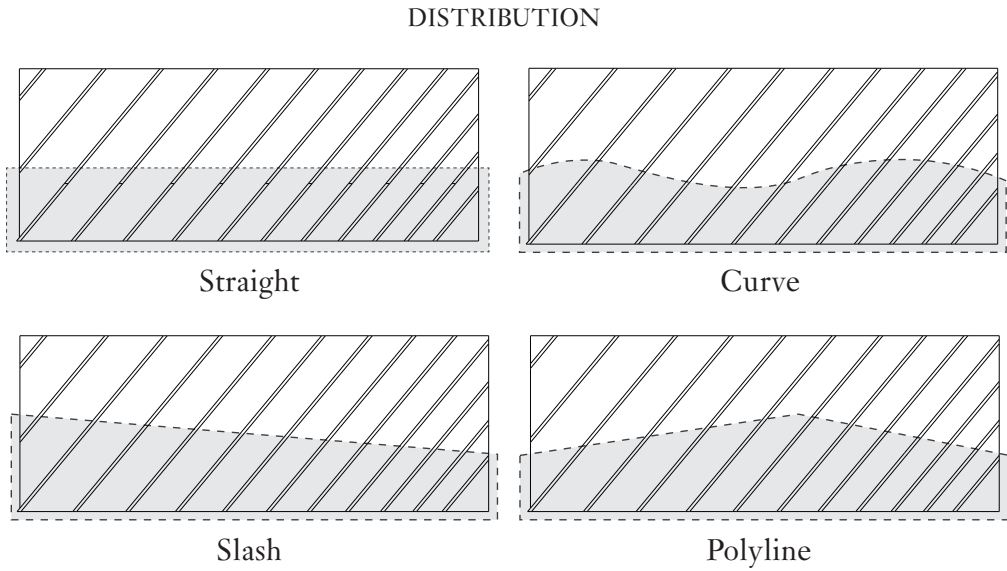
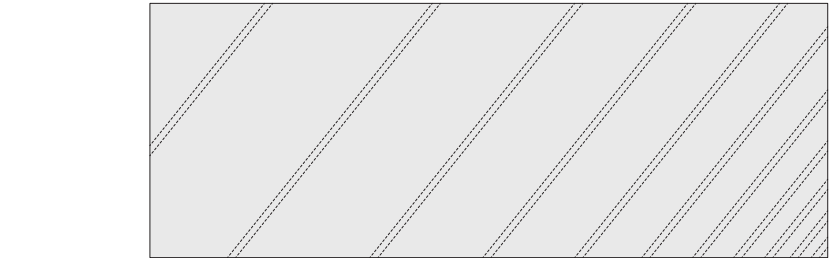
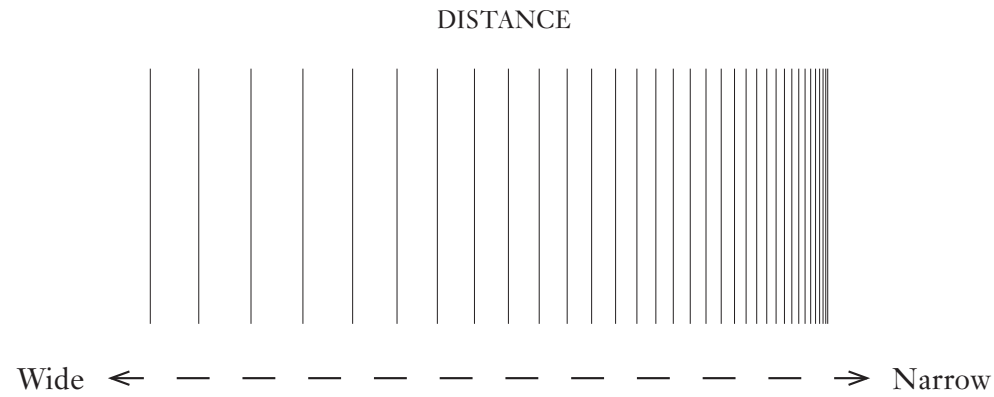
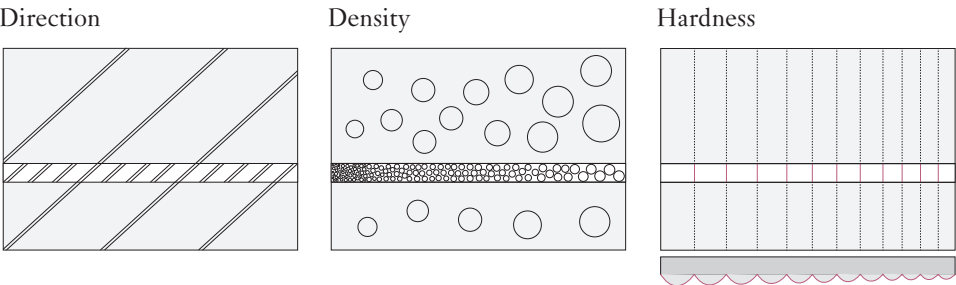
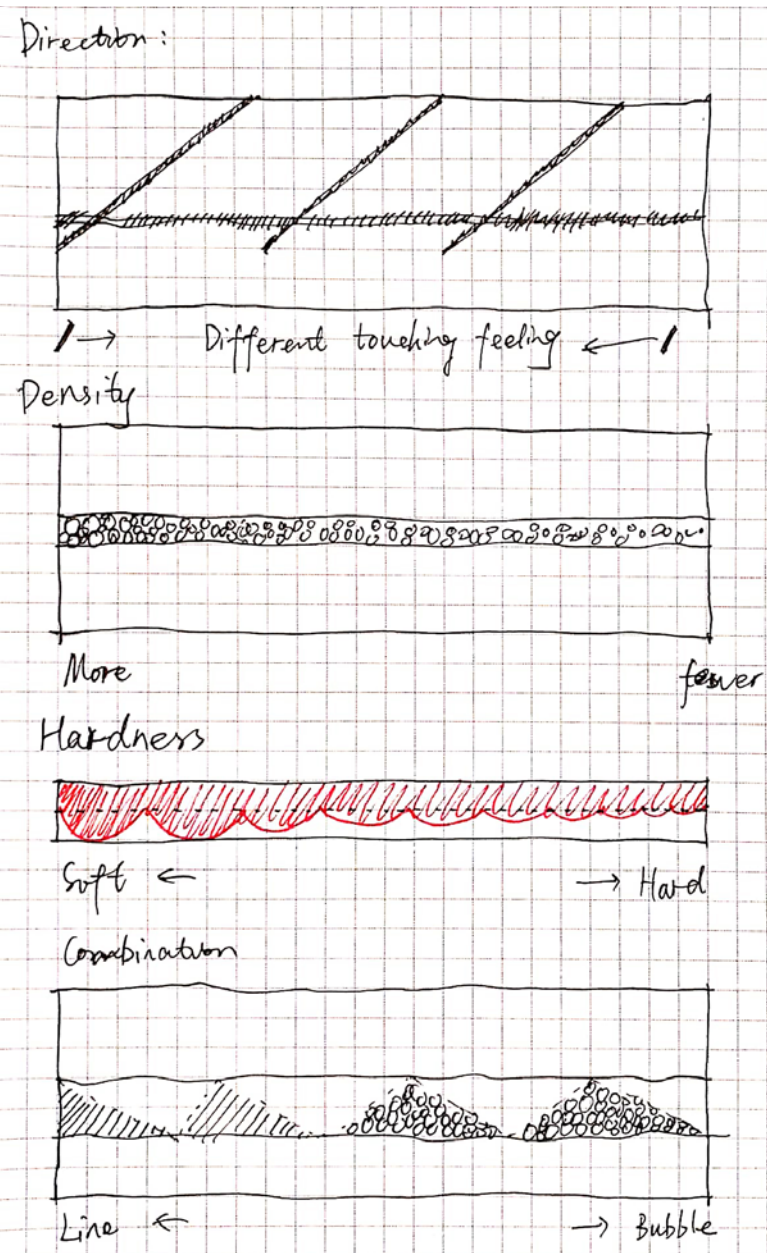
I did not find the best result in the end, but I provided the possibilities as many as I can for the users to choose.



DIRECTION WAY

Changing the distance between the lines could make people know not only the direction but also where they are. In addition, the density and hardness could tell us the orientation as well.

I divide the surface into two different parts, touchable and only visible. The touchable area is the part of the wall we can reach by our body.



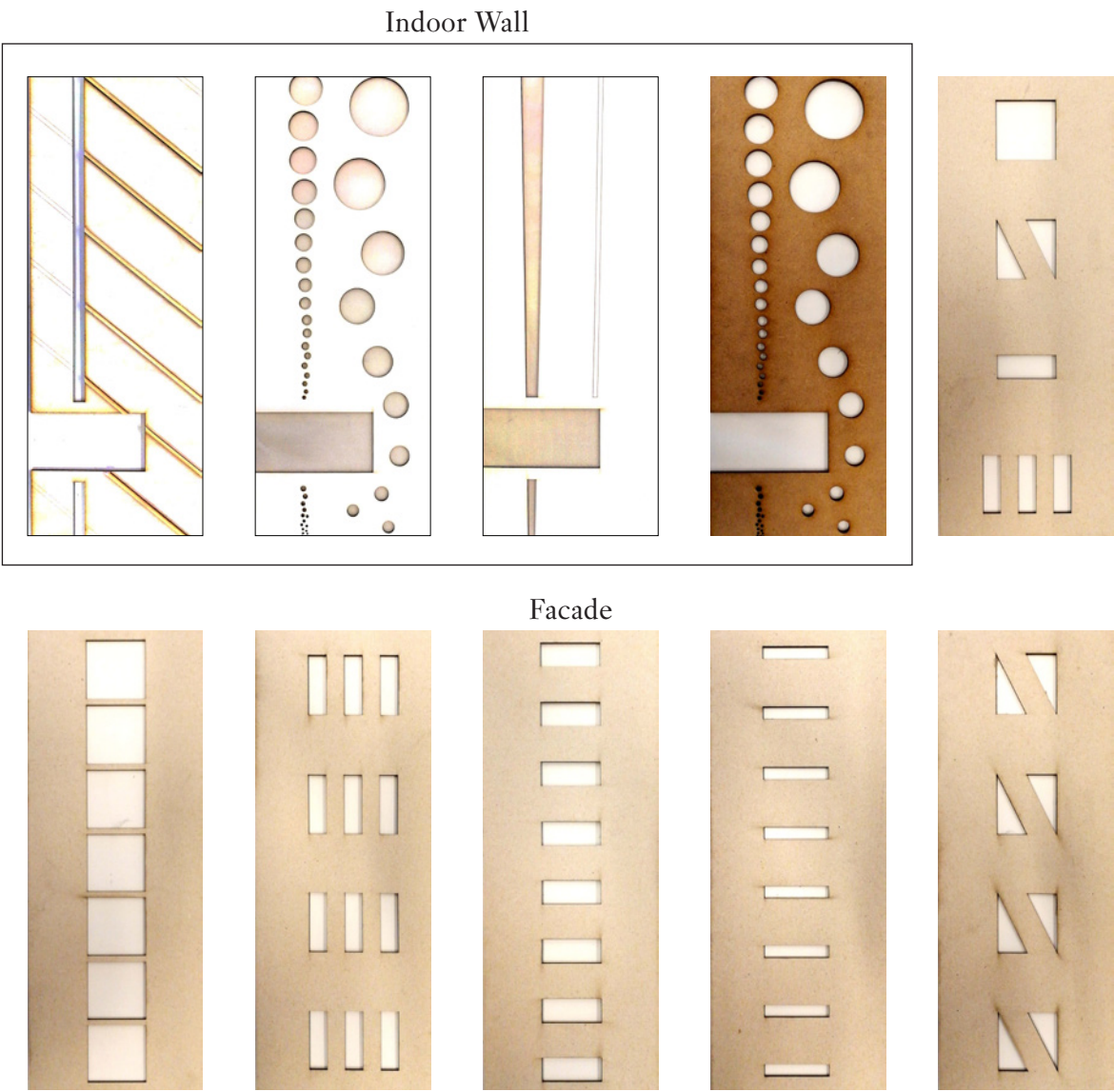
III

*Light interaction and material choice put together can create an extraordinary experience of sight and touch at once.*

- Touching
- Light
- Interaction
- Transition
- Sequence
- Situation



MODEL



Making facade pieces to test light.

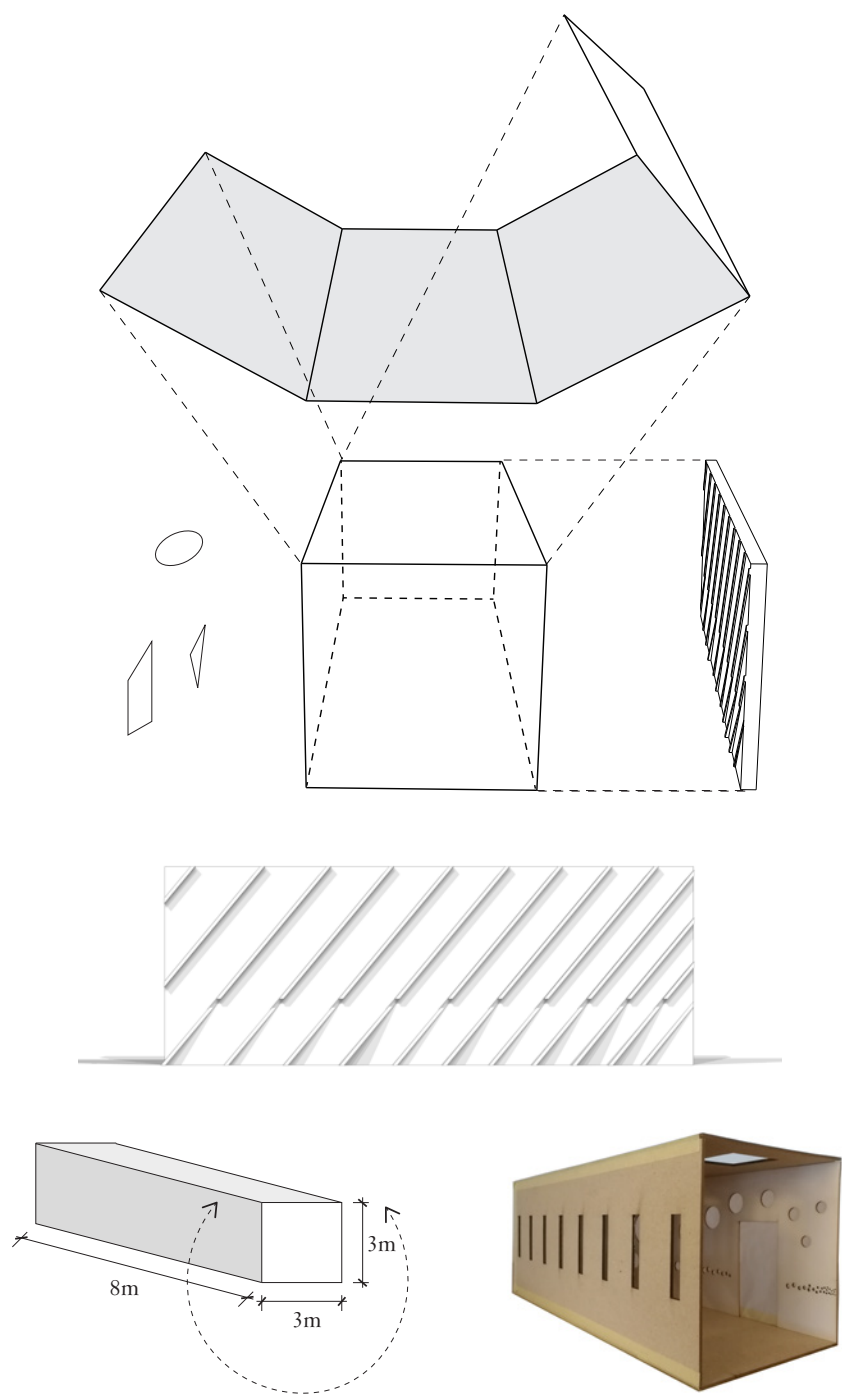


No enough light casts on the surface, it makes the shadow not so obvious.

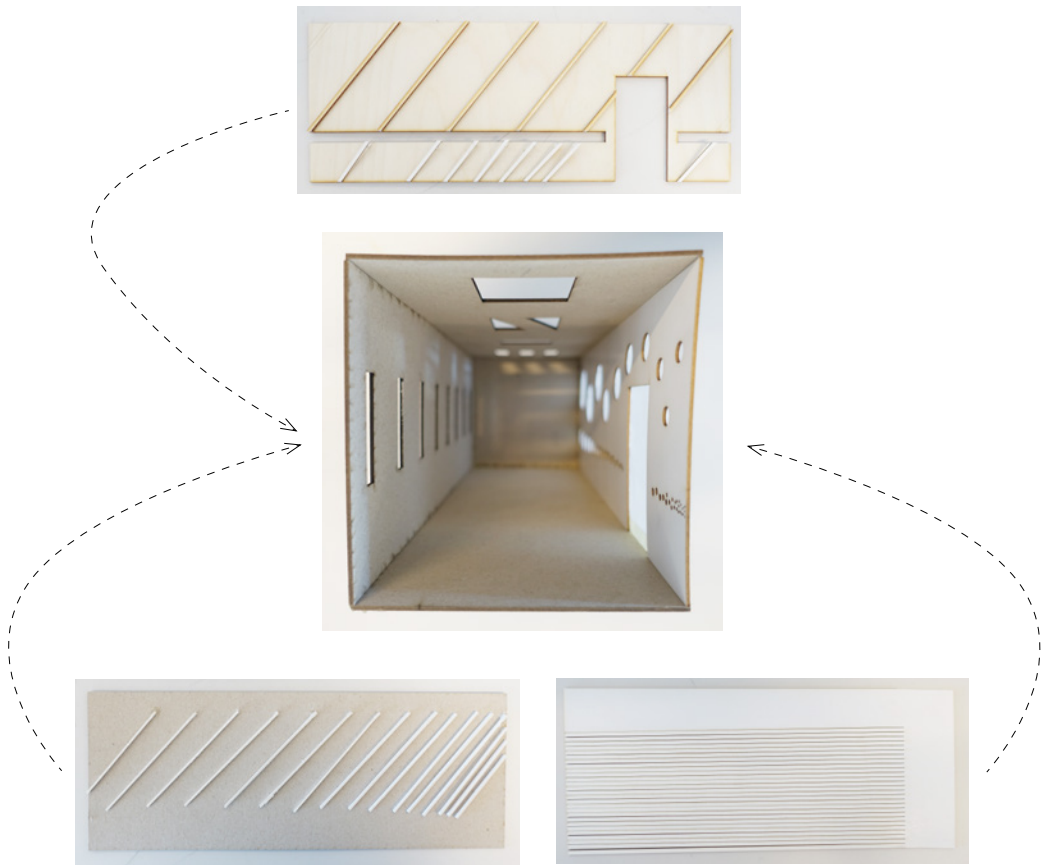
Moreover, I found that the same light holes cannot give people information of direction, but if the shape of holes changes from the beginning to the end, it can guide people the way. However, for architects, it is not a clever method to design the orientation system so simply and rudely. For buildings, it might make them look crazy.

PROTOTYPE MODEL

CORRIDOR



CHANGEABLE



Example

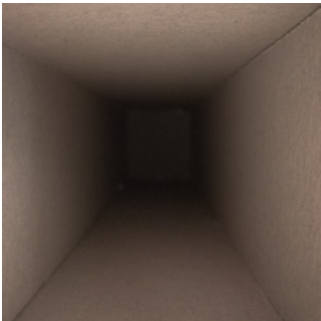


The size of facade, interior wall and roof are the same. It means I can change the roof to facade or the interior wall to the roof in one model, so I make a rotated model and tested it. Those model photos were the result that I got. Making pieces to change different walls and see possibilities. I can test several conditions by one model, saving my time.

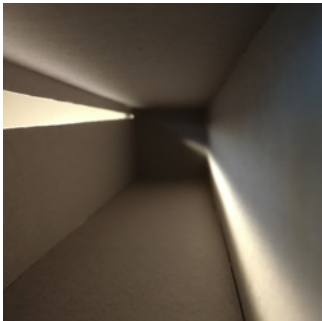


MODEL PHOTO

No light hole



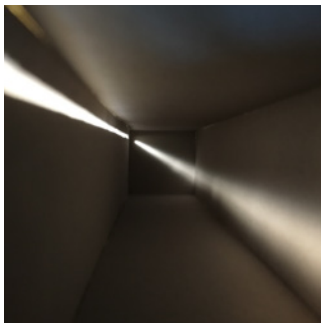
Changing



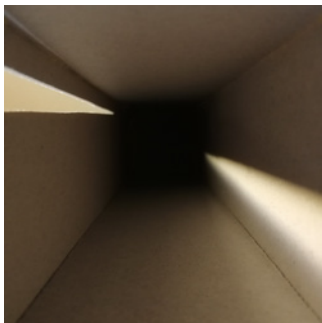
Changing



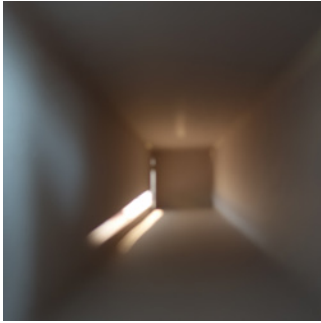
Long narrow



Changing



Changing

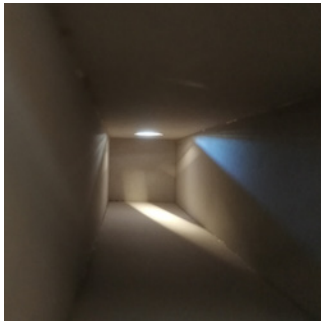


The hole shape

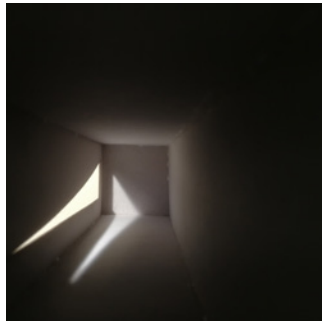


The changeable amount of light inside the space can give people information about direction as well. I tried to control the light inside and change the trend. When the hole becomes narrower, the light did not change a lot on the wall. It does not navigate people obviously.

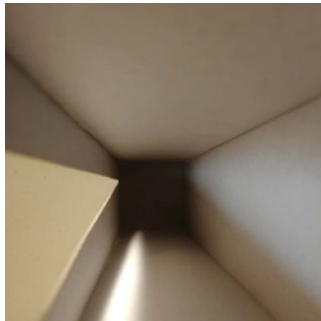
Circle



Curve



Long narrow



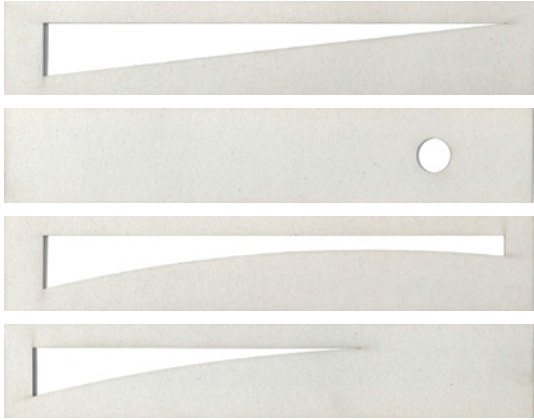
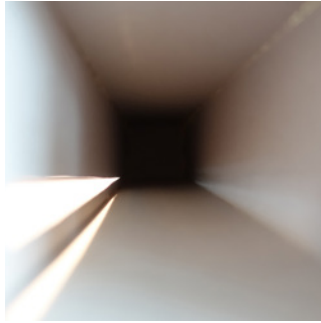
Circle



Curve



Changing



In conclusion, it is not the best way to orientate people by the changing of light but it is helpful. For example, one direction is dark and another is light, definitely, the person can know where he wants to go.



### III

*The building is still, the person is active.*

Touching

Light

Interaction

Transition

Sequence

Situation

## LIGHT DANCES

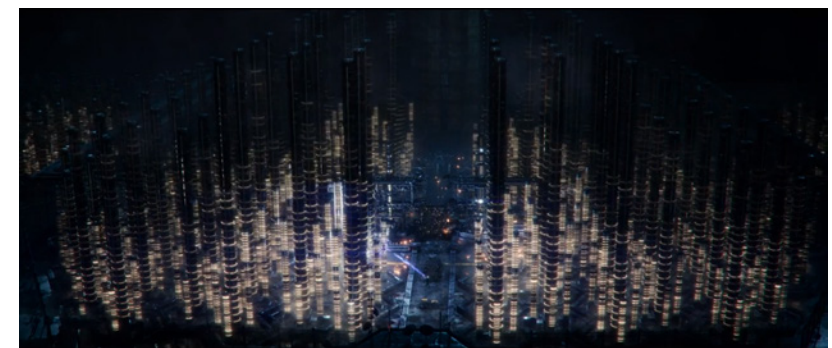
Interaction is the method to combine light and action together. I got inspiration from a Japanese exhibition photo and a movie " the amazing spider-man2 ". From the picture, we can see that when the person touches the wall, the light and shadow move and dance on her hand. It means that action can affect light movement and interaction can influence light as well.

Let light dances on the wall!



Source: <http://torafu.com/works/min>

The Amazing Spider-Man 2 by Mark Webb



When the Spiderman fought with Electro at the power station in the movie, the power generation columns light up with the melody. The light dances like a song, attracting me a lot. I felt excited as the light had its own life, its movement was a super beautiful drawing in front of my eyes.

MODEL PHOTO

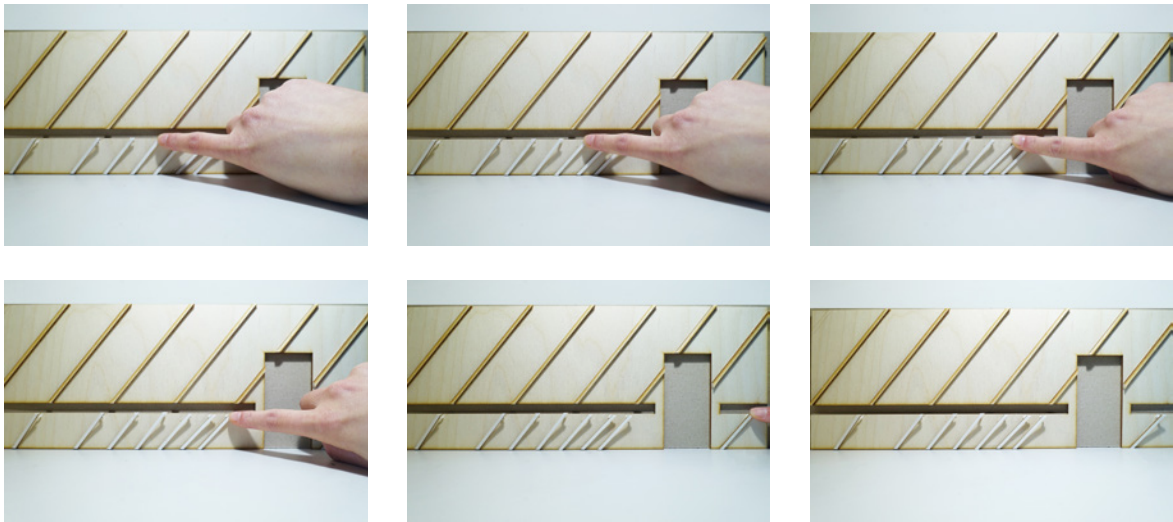


It is a test model that I found when I moved the model, the light and shadow jumped and danced. It was just like a game when I was a child, I was fond of touching the fence and running.

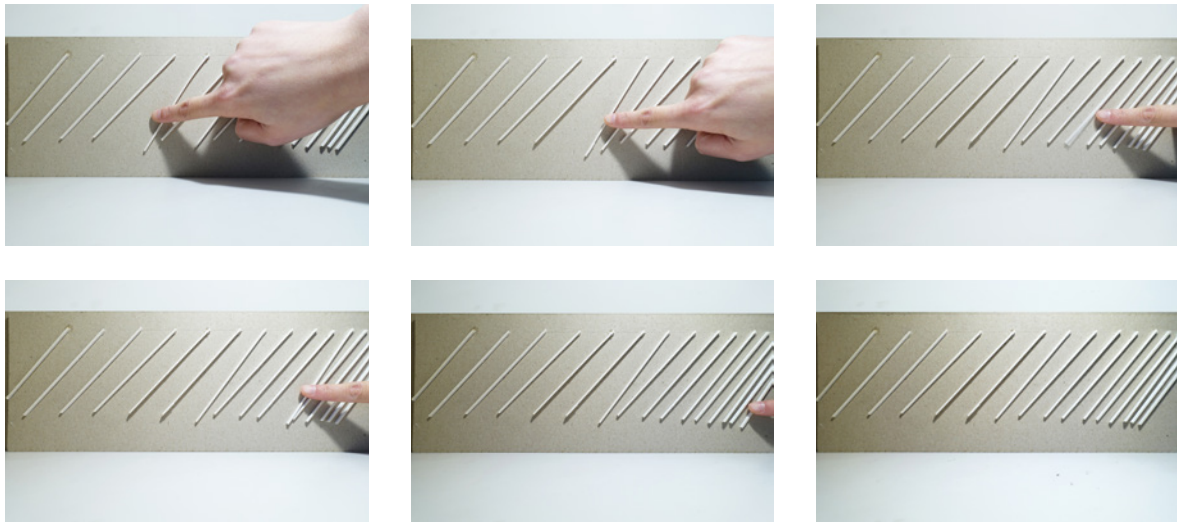




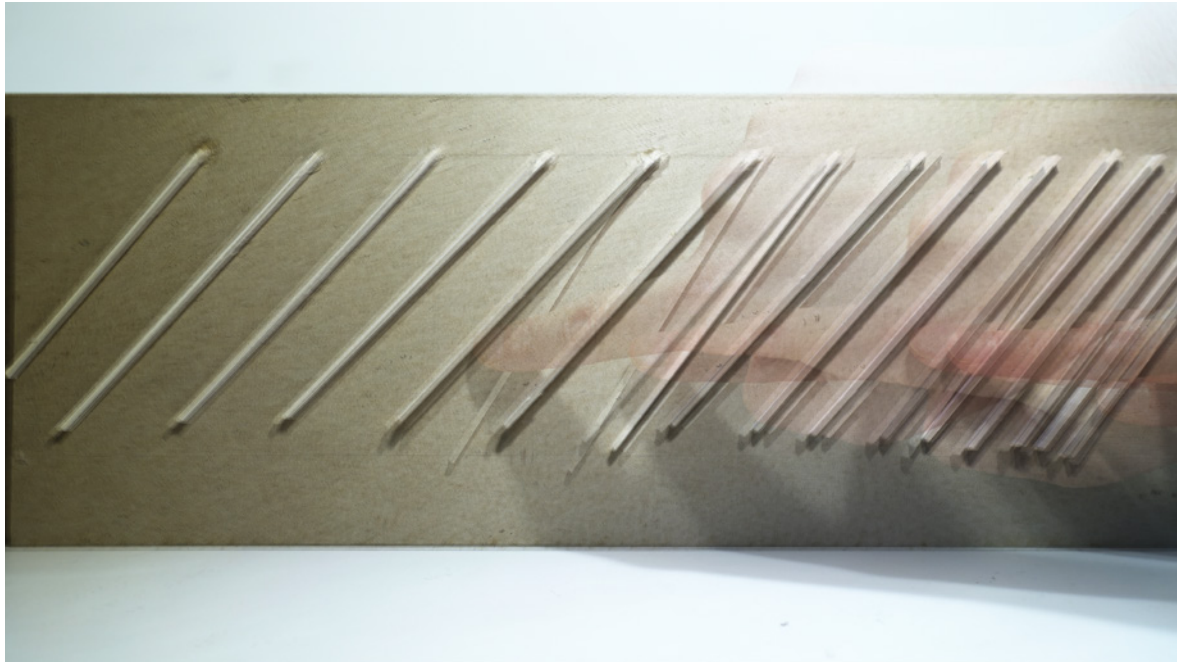
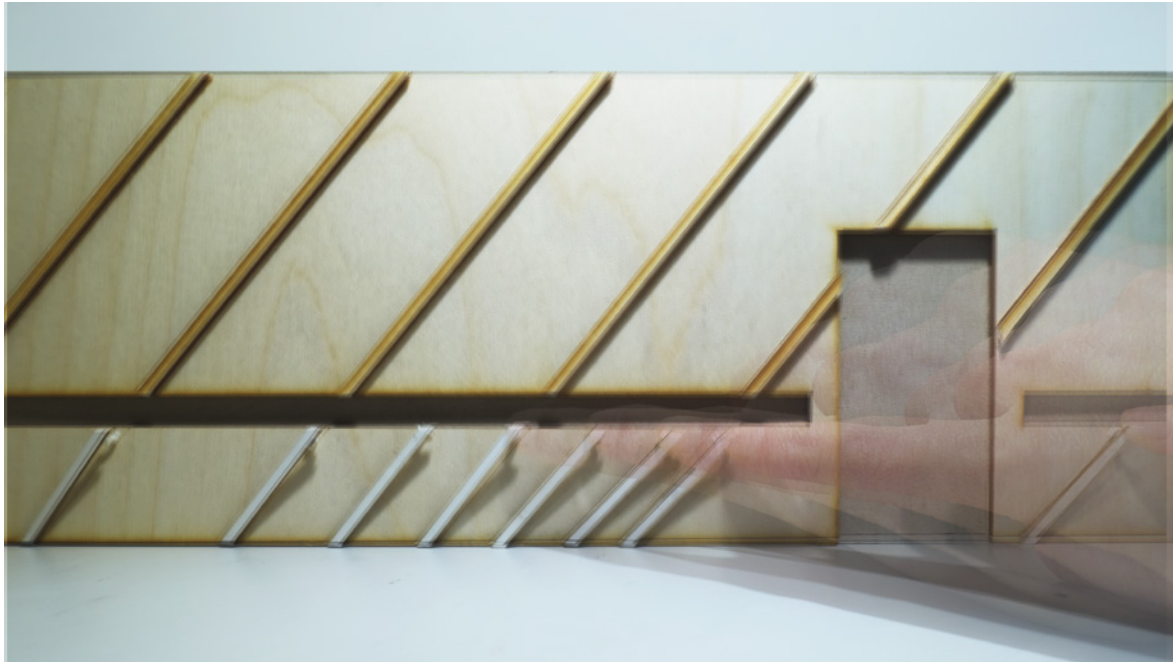
MODEL PHOTO



Vertical

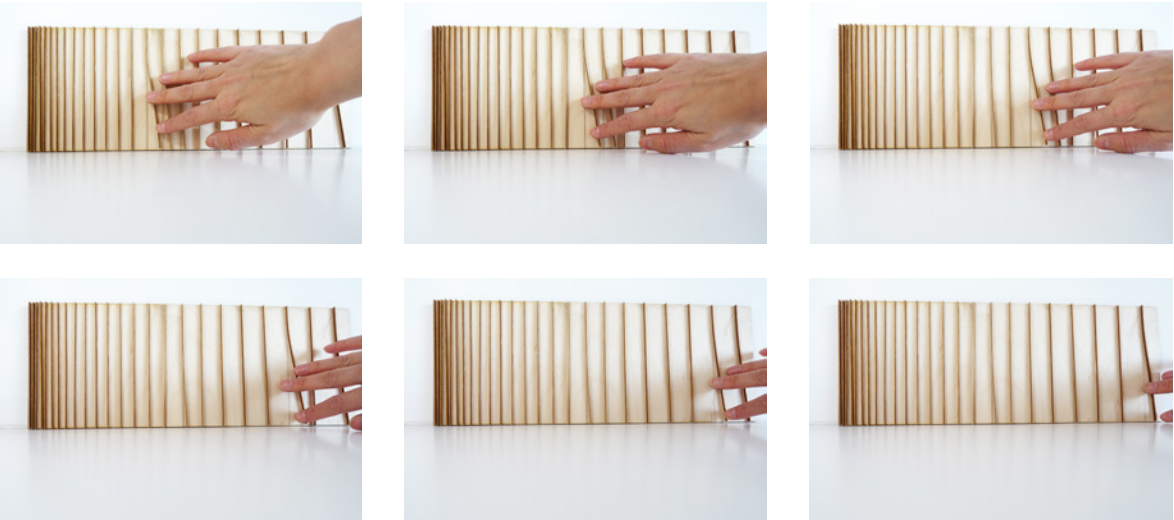


Horizontal

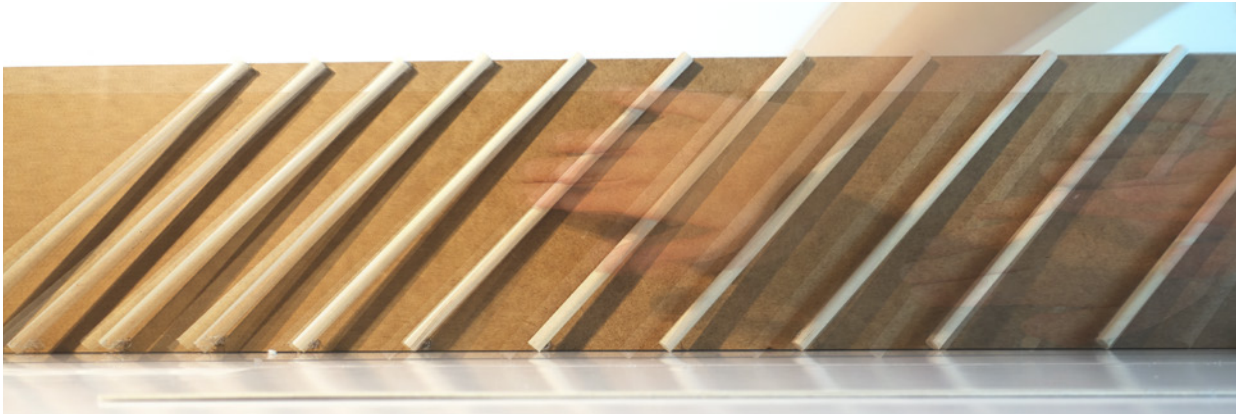
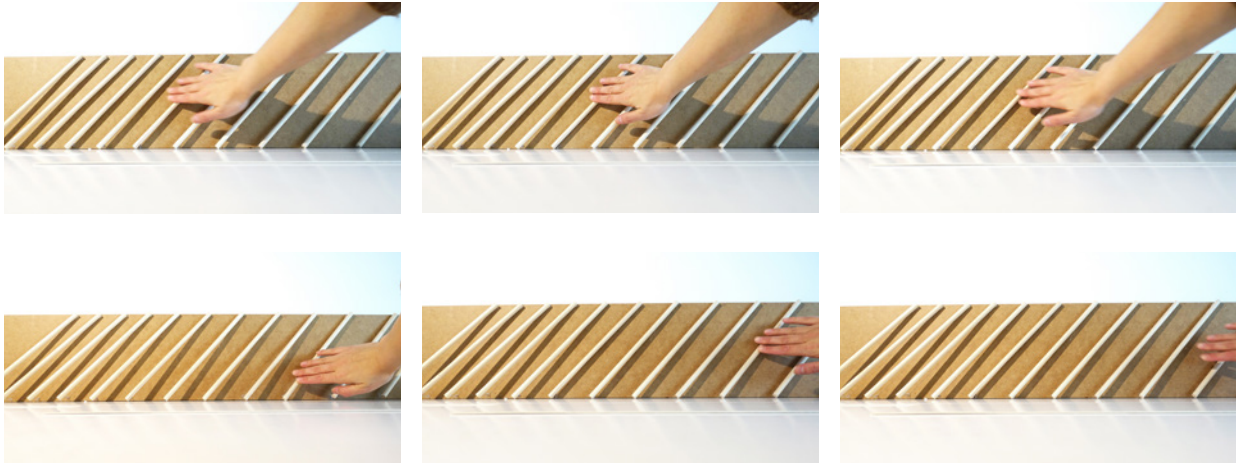




MODEL PHOTO



Straight



I chose the wooden stick as the material used for people to touch, because the surface of round sticks is smooth and does not have hard corners, so it will not hurt people. You can press and pull those sticks like a game. The aim of this design is to attract us to touch the surface to orientate ourselves, not only for the view.

Architecture has common things with art, they are about beauty and truth, about the happy moment. The navigation system is functional-oriented in tradition. We always use it because it is useful, not interesting. In most projects, the navigation system could be solved by signs. However, architectural elements are the essence of spatial orientation.

### III

*Architecture consists of situations and transitions.*

Touching

Light

Interaction

Transition

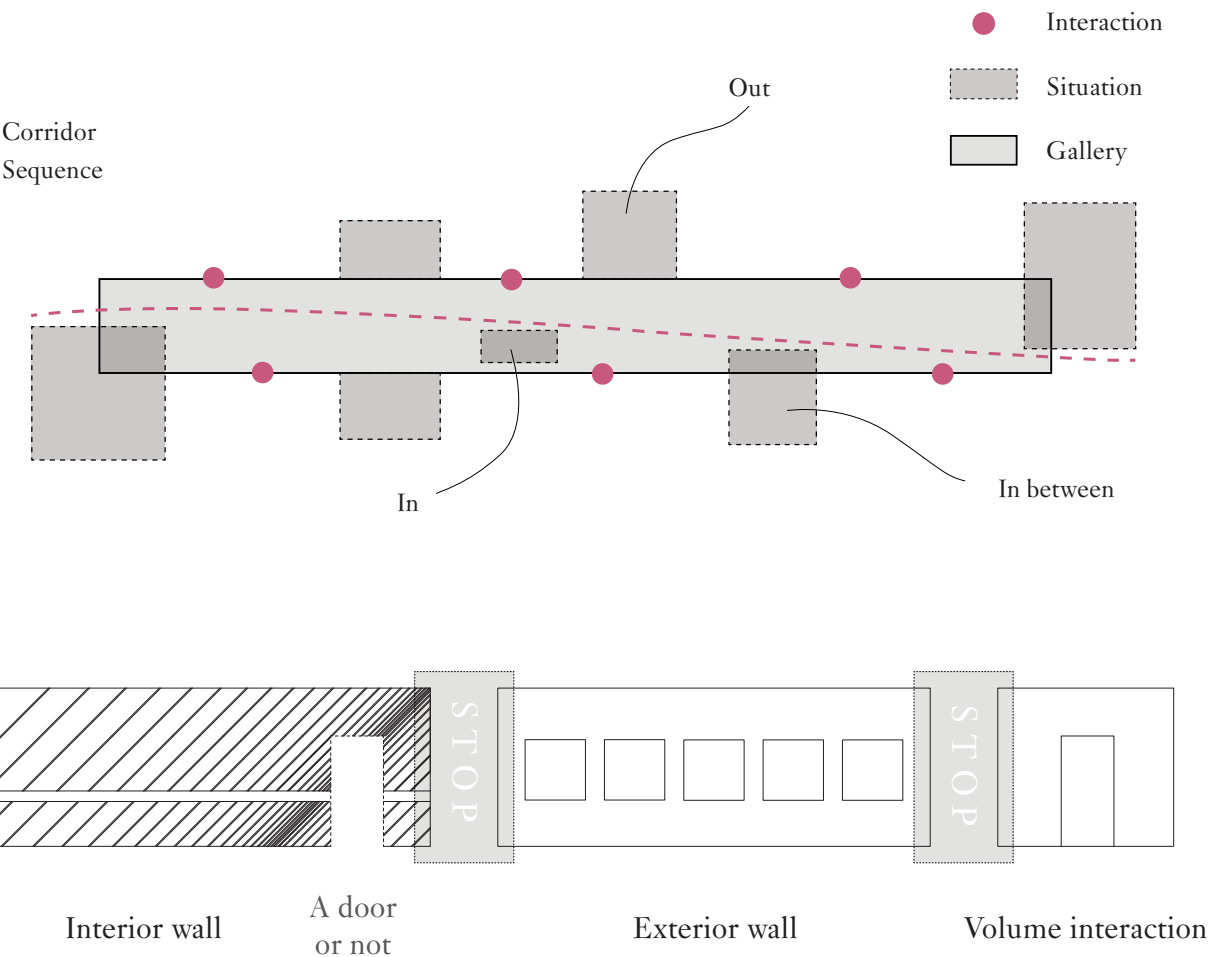
Sequence

Situation

# TRANSITION

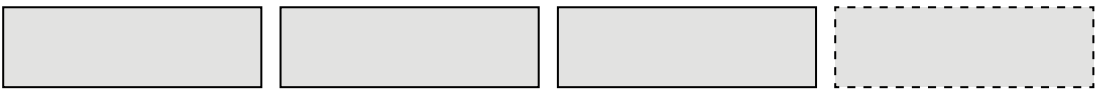
Light and interaction could be the transition part of one project. It is the stops between different kinds of space. I choose the corridor as the research target. In the long gallery, you can see a window, a door, a handrail or a man. And you can also touch the wall, see through the window, enter a room, exit the gallery and talk with a man as well. I mixed all the situations in a long gallery. There will be a lot of stops in the corridor. Using the light and action to be the transitions of different situations and be the rhythm of orientation system.

The transitions between different situations are the keywords to form my orientation system. People walk in the long corridor, when they feel the transition, they will know something happens ahead.

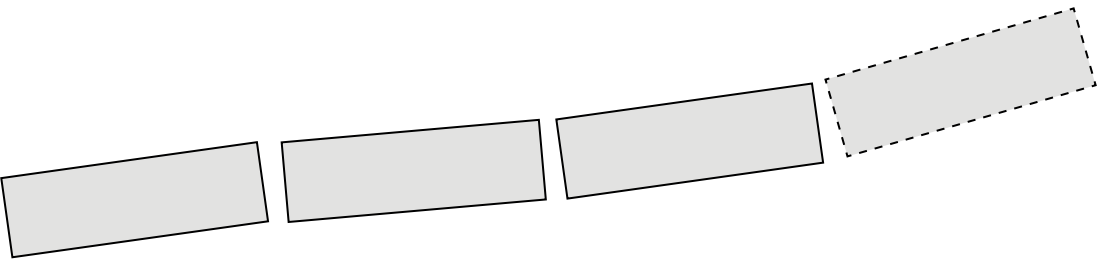


## The combination between different corridors

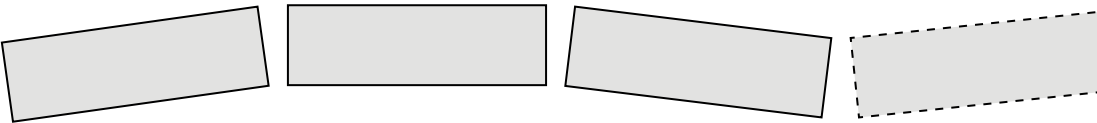
There are three main ways to combine corridors: straightly, rotating in the same direction and in the different direction.



Straight

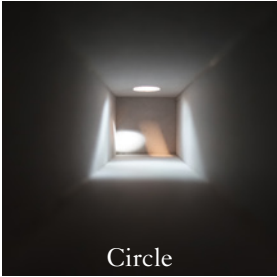

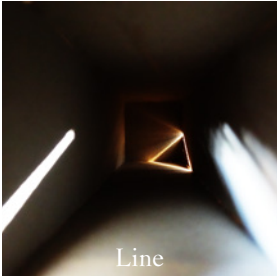

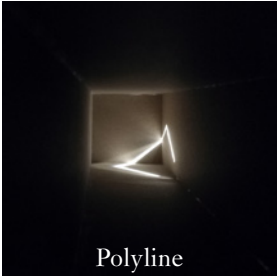





Same rotating direction

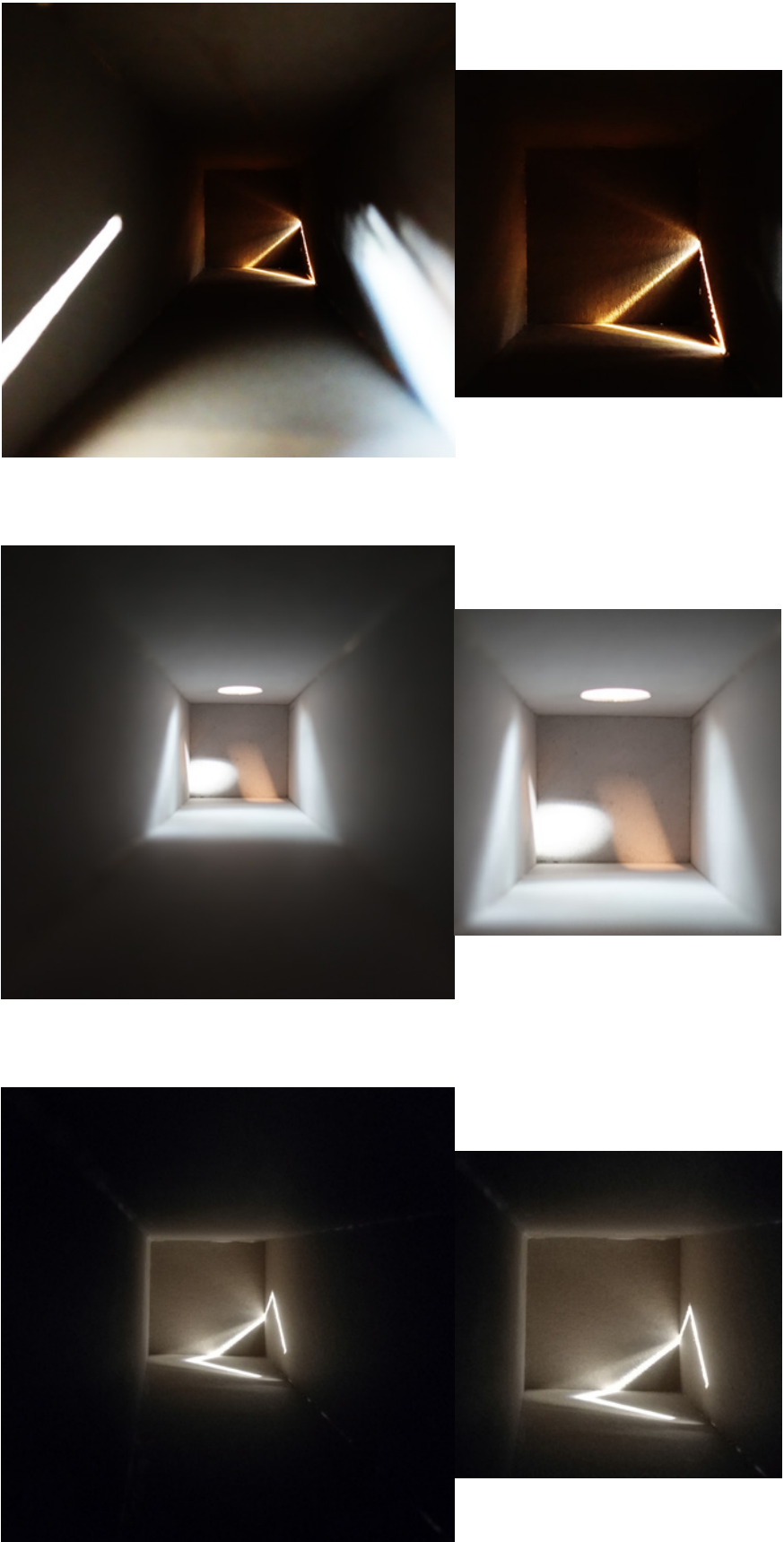


Different rotating direction

TRANSITION

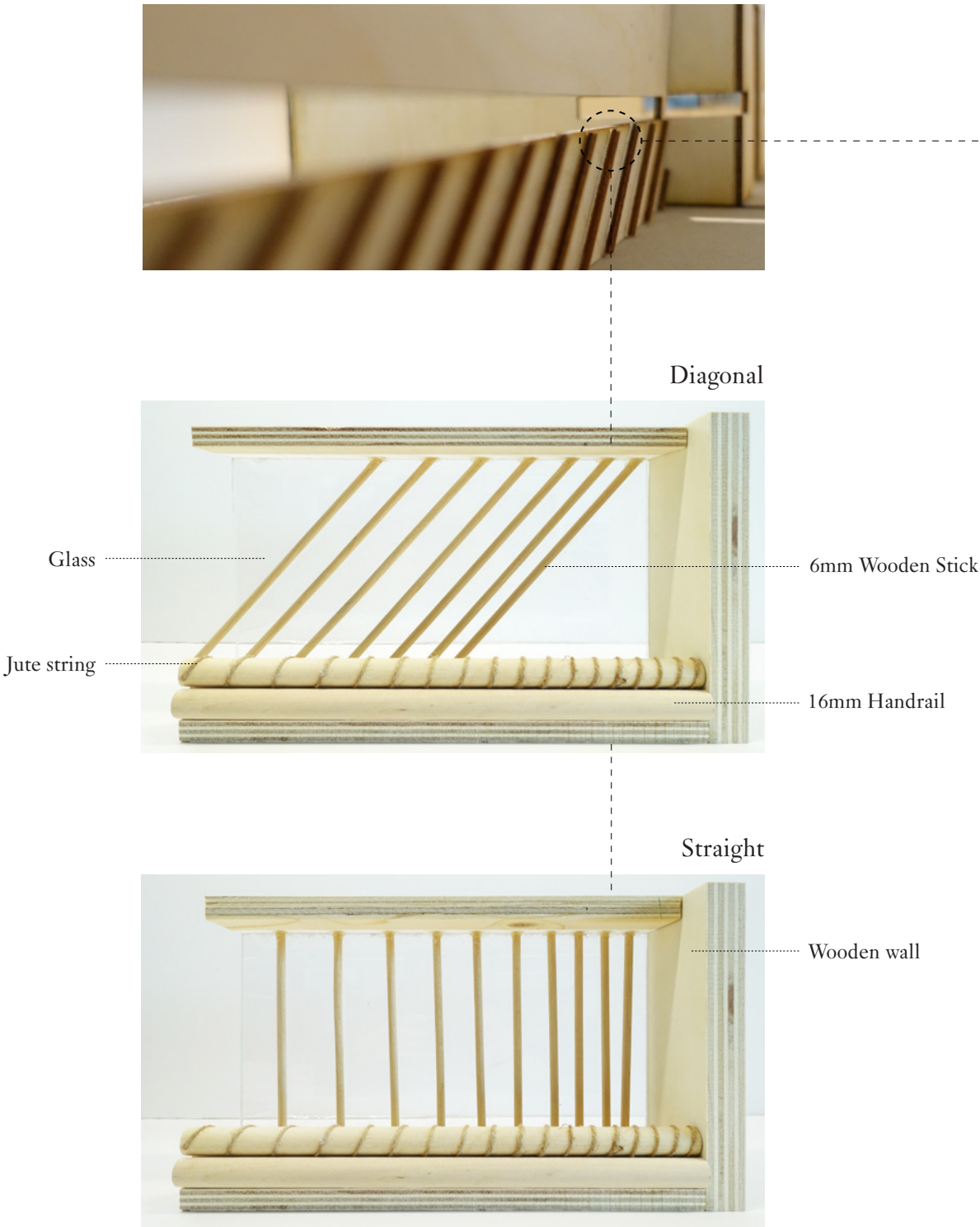
TRANSITION	METHOD	EXAMPLE	
Light ●	Light holes Light line	 Circle	
		 Line	
		 Polyline	
Touch ●	Interaction	 	

As I said before, light and touch are the orientation system for me, meanwhile, they are transition methods for the corridor. When the situation changes, you will at least receive one kinds of transition information. Light or touch or light and touch.





1:1 MODEL



The texture lines of the handrail part have two types, diagonal and straight one. Which type will be applied to the project? It depends on people's preference.



The touching theories could be applied in all the buildings by simplifying the structure and material of the touching part. It will make more conducive to the promotion of my theories. In this case, I chose the jute string. You can also use yarn, woollen or other common materials. The structure is also very easy to build.

MODEL PHOTO





MEASUREMENT

WHY THIS SIZE ?



16MM

As I said, I put three together, aiming at holding people. However, it seems not suitable for everyone as the size of hands is different. My hand is small compared with my friends. When I feel the size is suitable, they will feel not enough. Surprisingly, it creates something interesting. The size is enough for me to hold, while other people have a feeling of touching more than holding.

8MM

As what my model shows, when you touch it, you will know the size of sticks is nice to be pressed and pushed. It is just a feeling from your heart directly.

6MM

I tested different diameter of round sticks to find which is the best size for people to move horizontally. The 6mm one is the best size for me. I can move it quickly and easily.

Three

This size for children and small adult is handrail, for the big hand adult is a touchable guide line. The contact area of round sticks is larger for big hand adult, so the touch feeling is more obvious.

Two

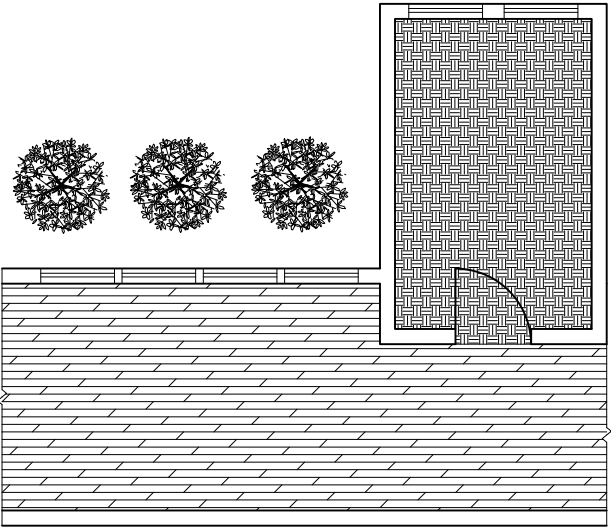
This size for children and small adult is a touchable guide line, for the big hand adult is only a touchable surface. It is not a reasonable size for the handrail.

III

*The sequence of architecture is space, event and movement.*

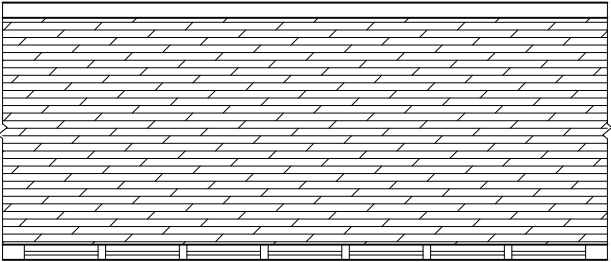
- Touching
- Light
- Interaction
- Transition
- Sequence
- Situation

PLAN



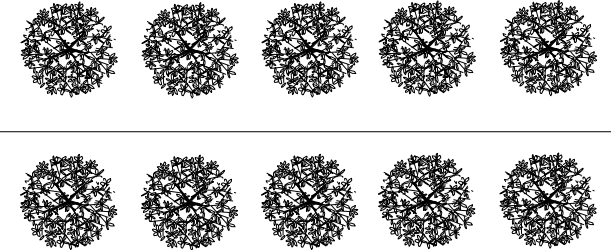
Corridor 1

A part of the room is in the corridor  
The room and windows are on the same side



Corridor 2

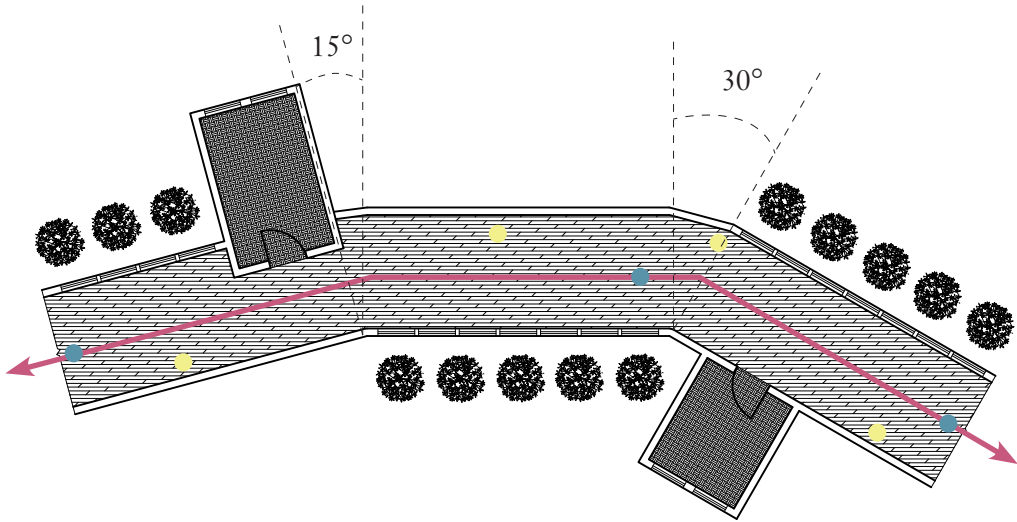
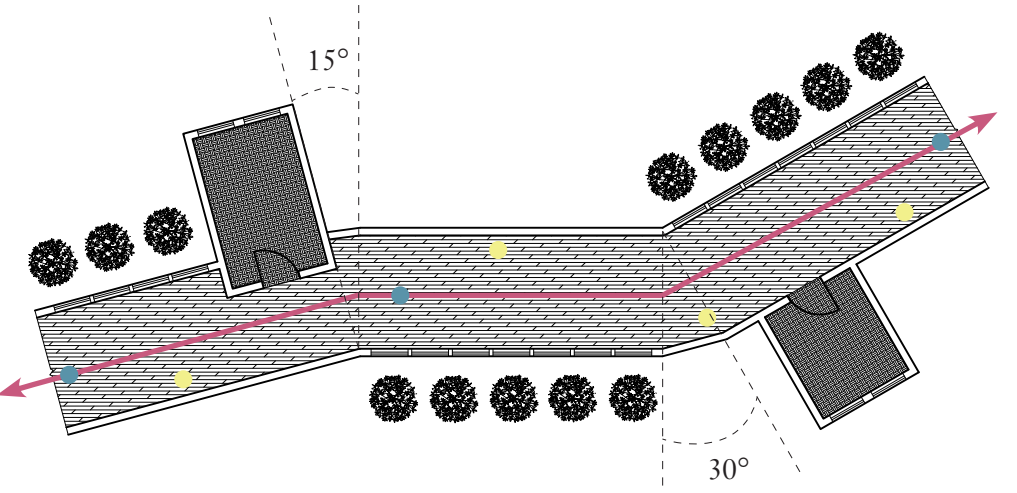
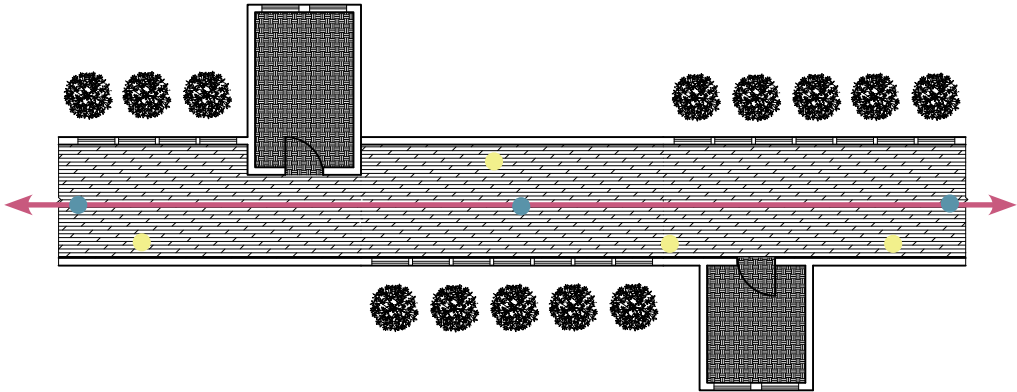
Wall and windows are on the opposite side compared with other corridors



Corridor 3

A door is on the wall  
The room and windows are on the different side

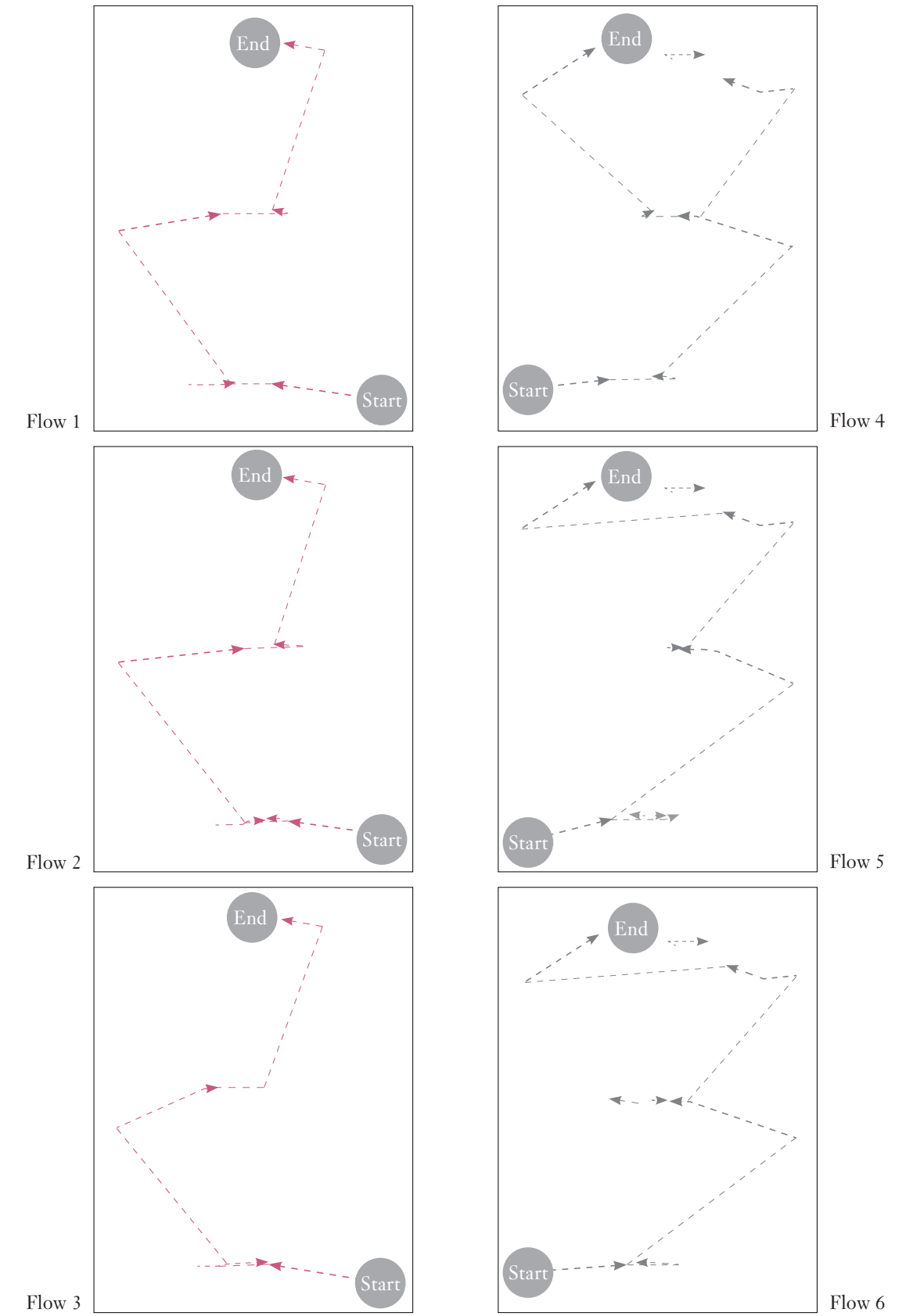
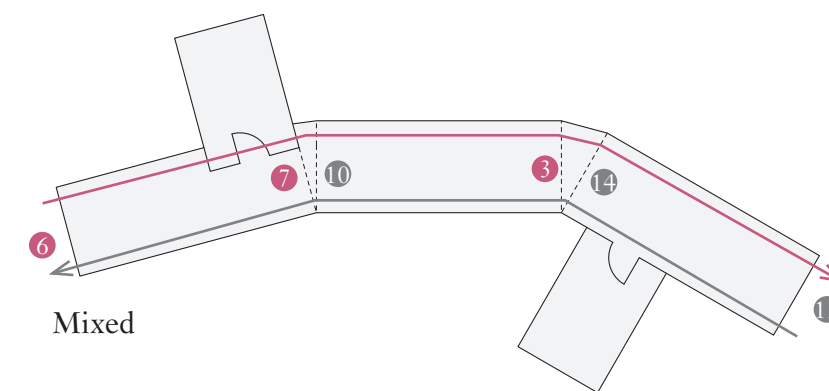
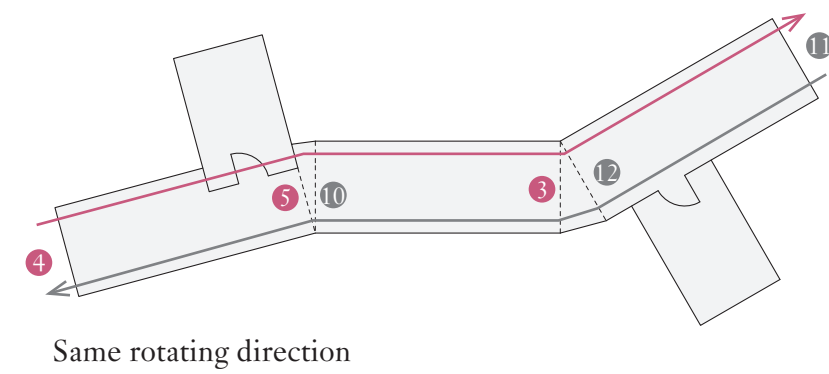
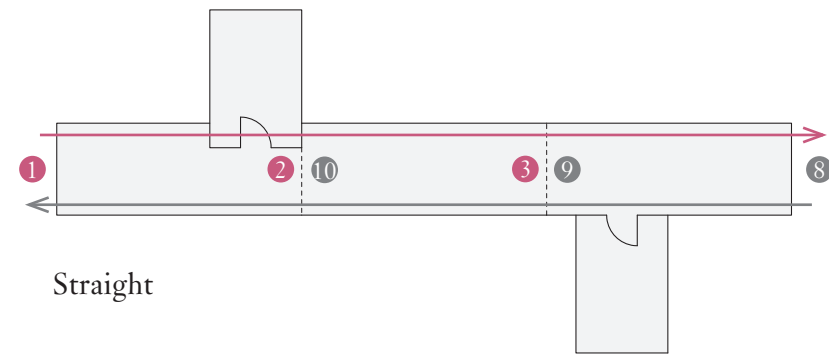
SCALE 1:100



SCALE 1:200

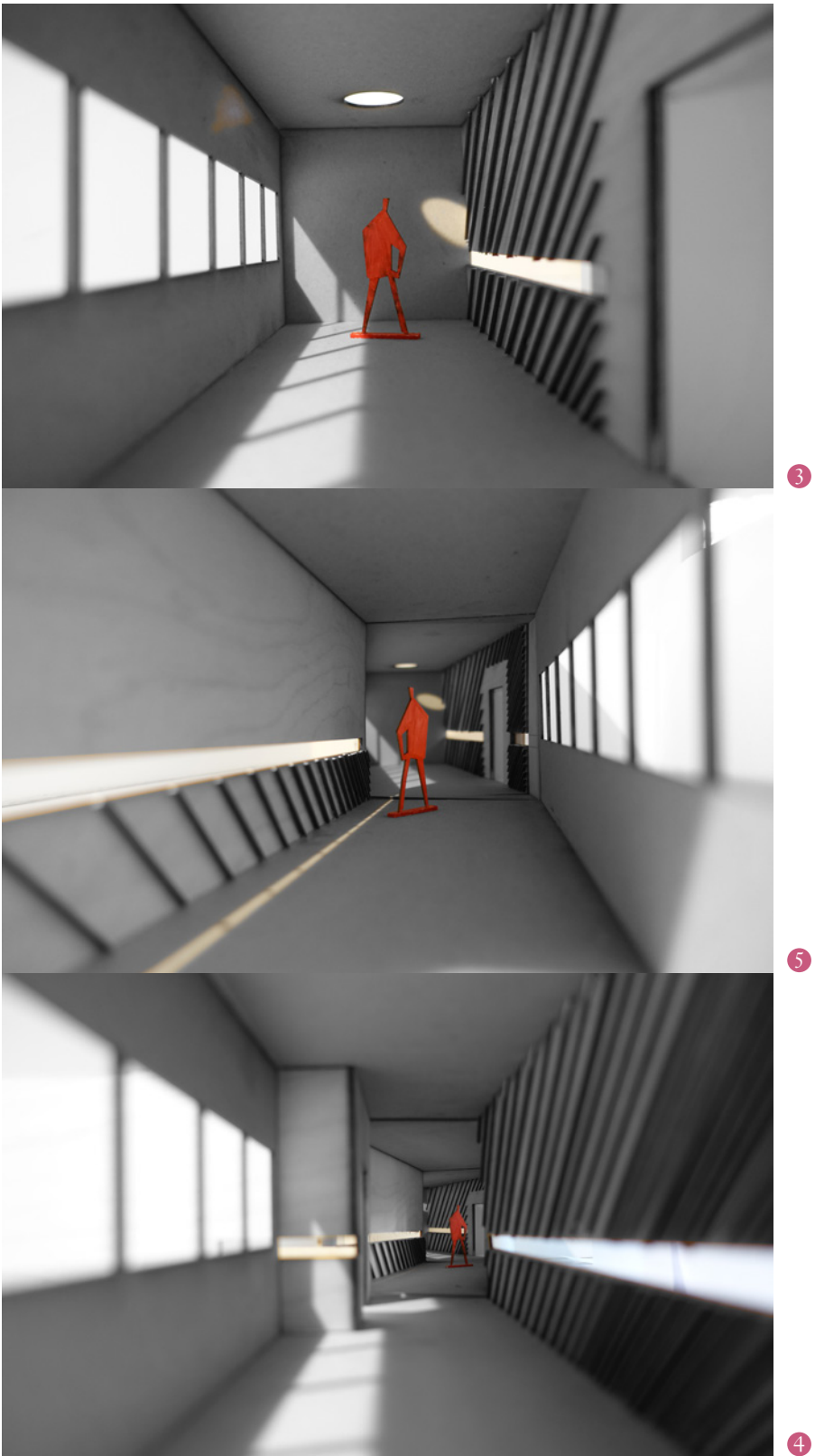
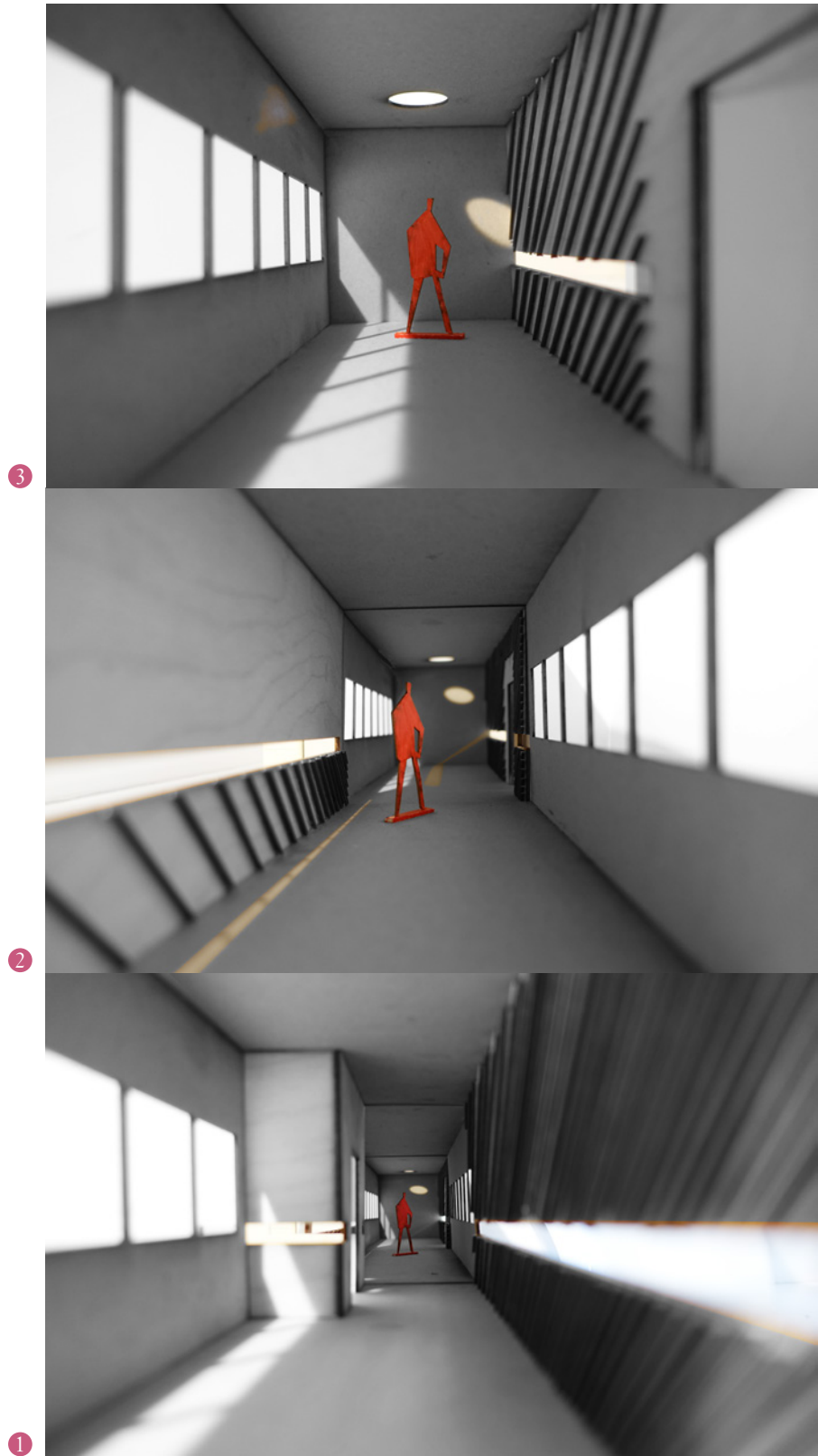
● Light  
● Touch

## SEQUENCE

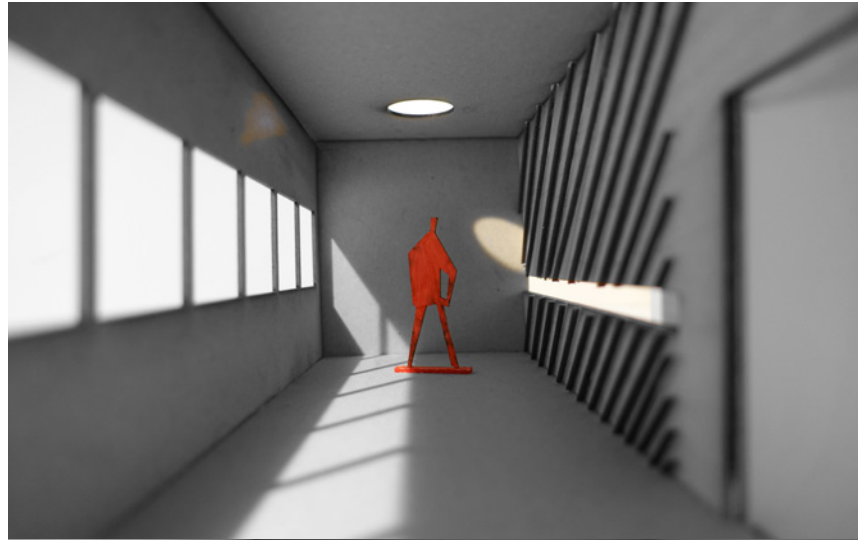


The flows of orientation system are continued, seen from the direction of the arrow.

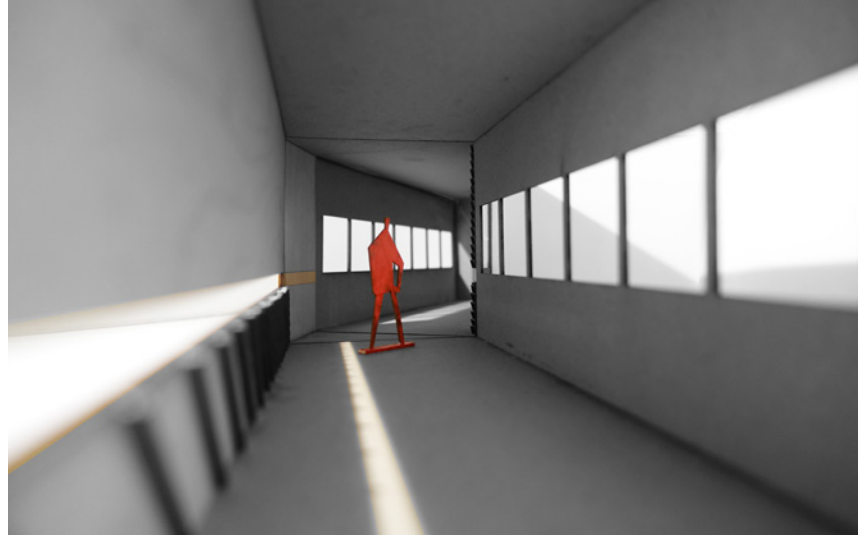
SEQUENCE



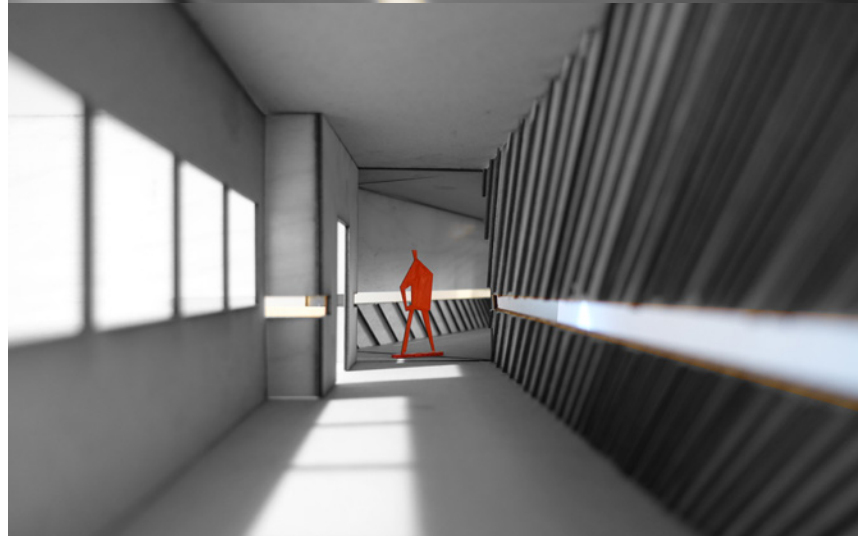




3



7



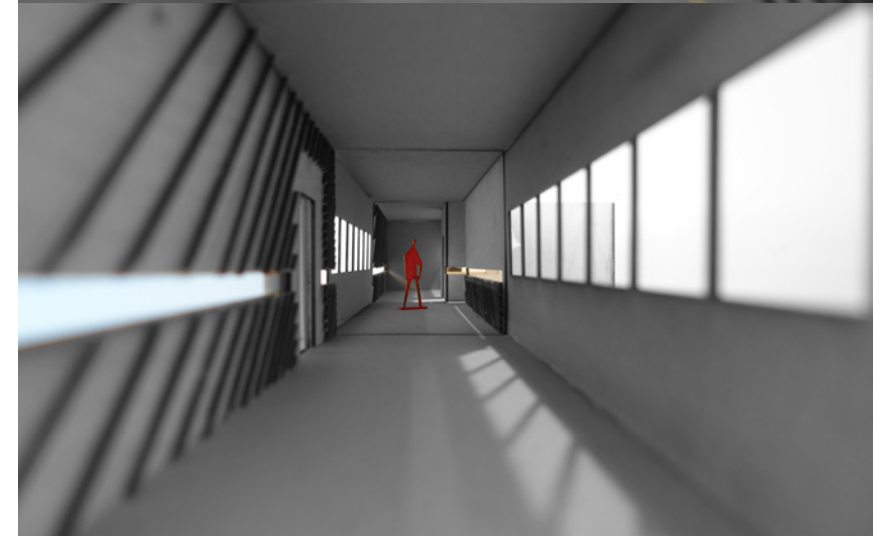
6



10



9

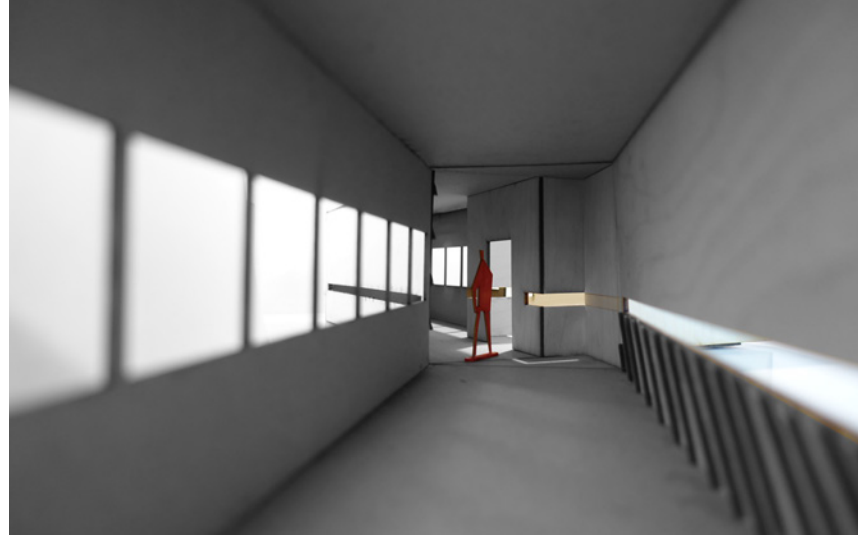


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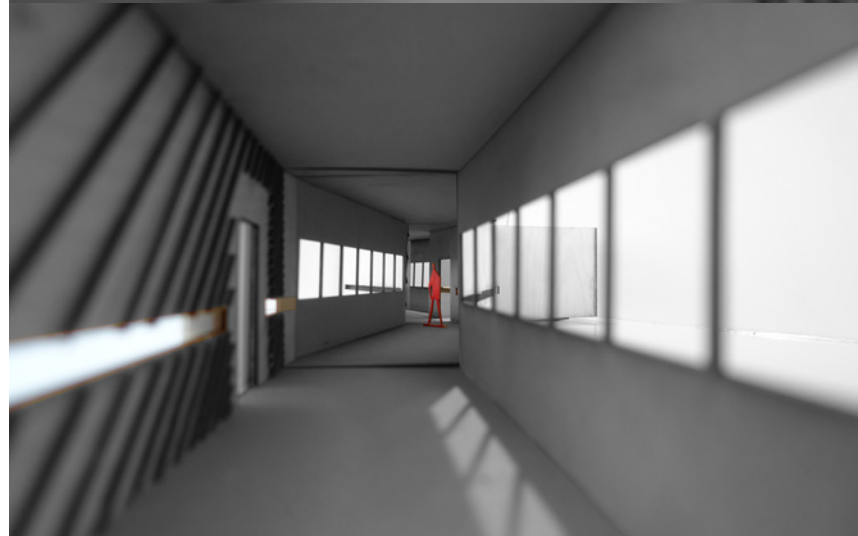




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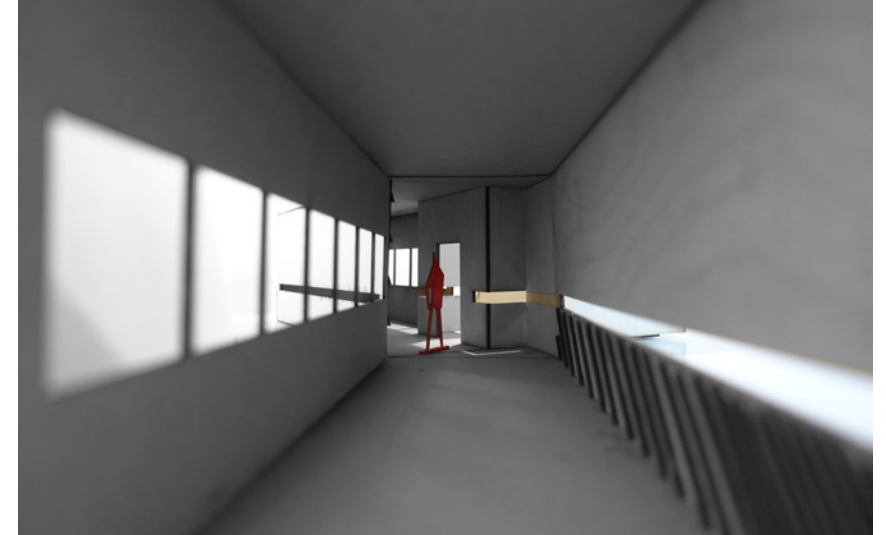
12



11



10

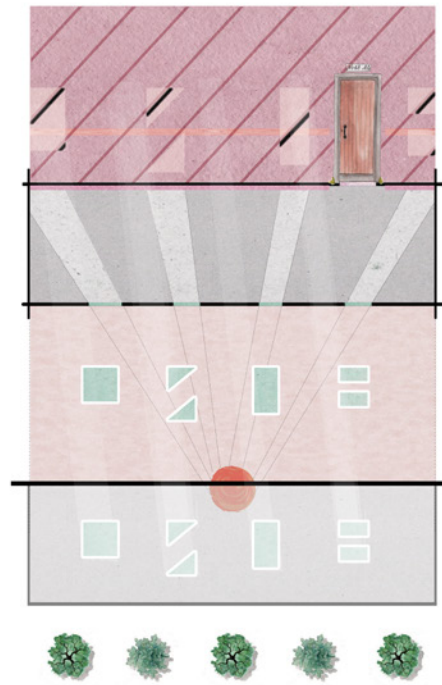


14



13

### III



Touching

Light

Interaction

Transition

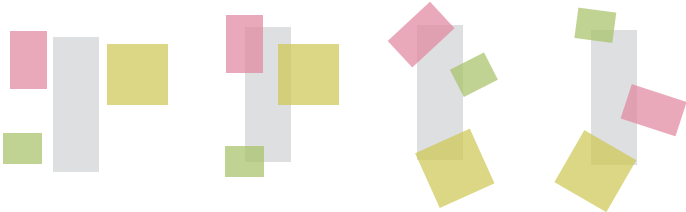
Sequence

Situation

*Situation is our activities.*

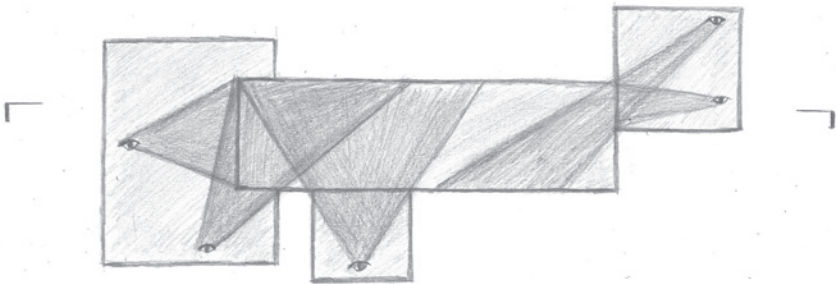
PROTOTYPE

Light and touch could participate in people's activities. It is another branch of research of spatial orientation and is parallel to the transition and sequence parts.

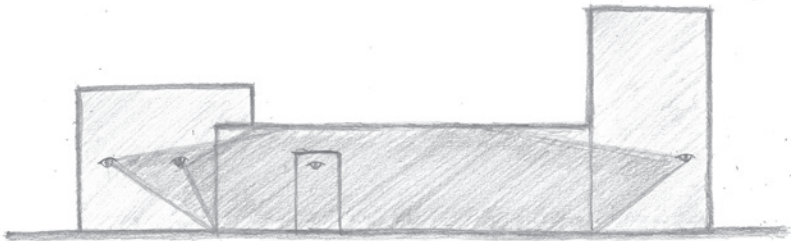


Those four space could be organized by different ways. When we receive the related information before we move, we could orientate ourselves correctly.

PLAN  
Visible area



SECTION  
Visible area



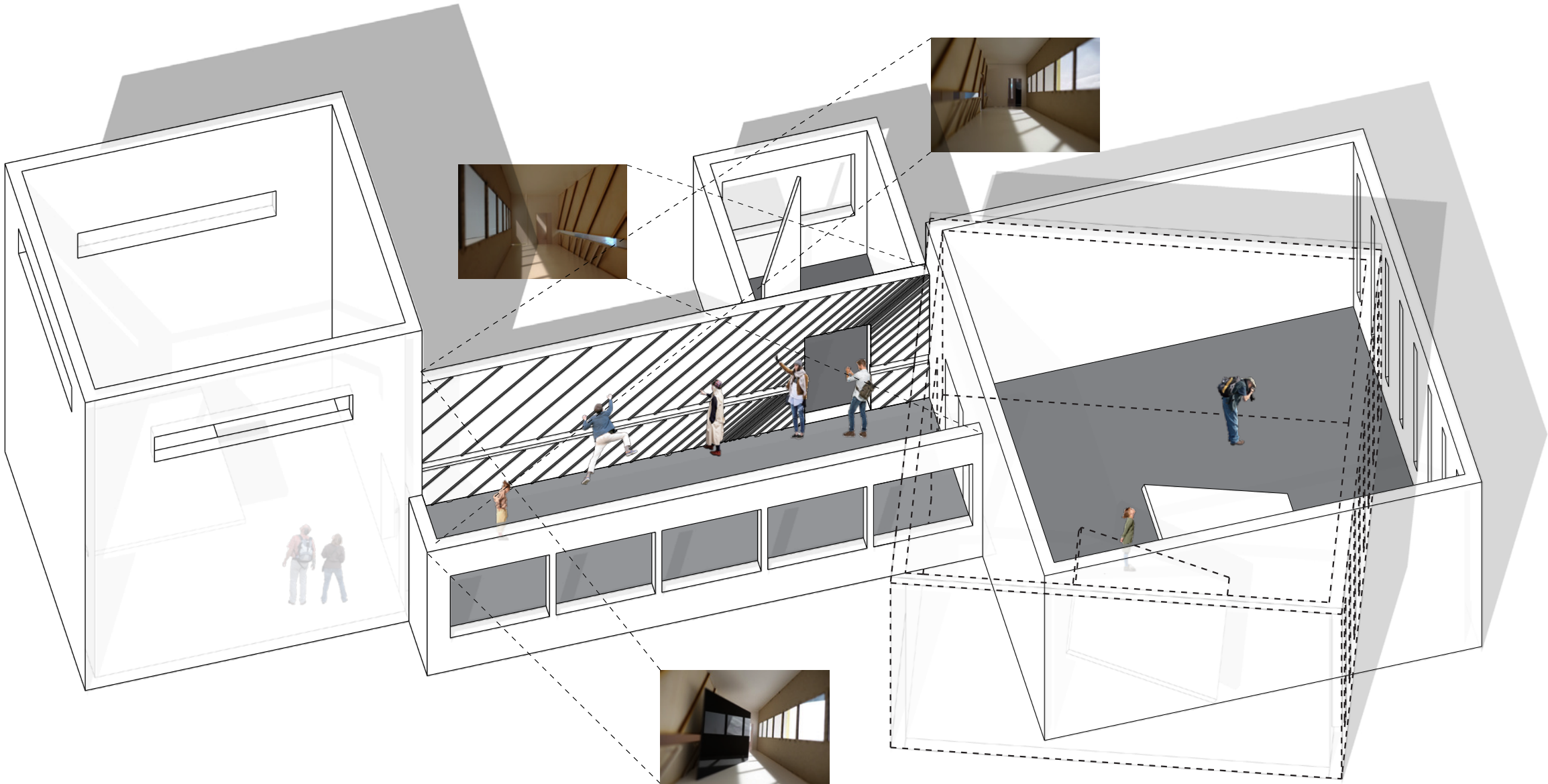
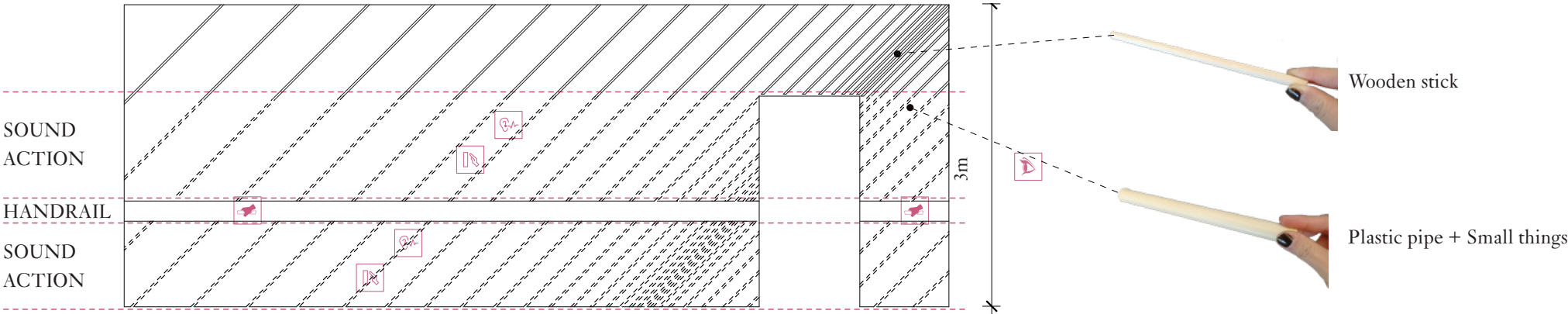
SPACE	PROTOTYPE			FEATURE
<div><div></div><div>MIDDLE HIGH</div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	Long Narrow High Window
<div><div></div><div>SMALL COMMON</div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	Big Window
<div><div></div><div>LARGE OPEN</div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	Narrow Long Window
<div><div></div><div>LONG TRANSITION</div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div>	Common Window

Those four prototype models have their own basic form and then they can be changed into other shapes. For example, the cube can be cut into a polygon.

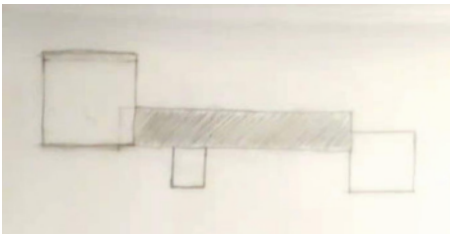
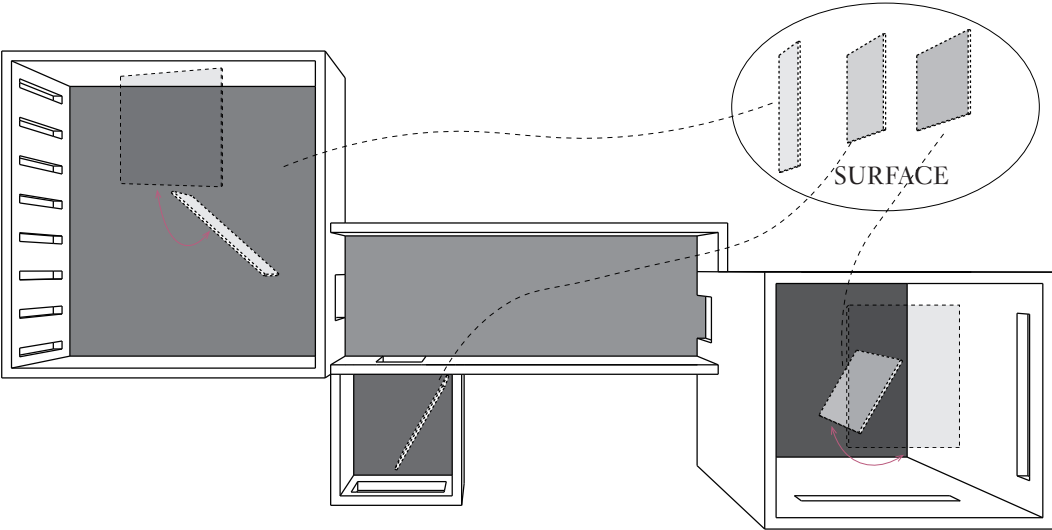
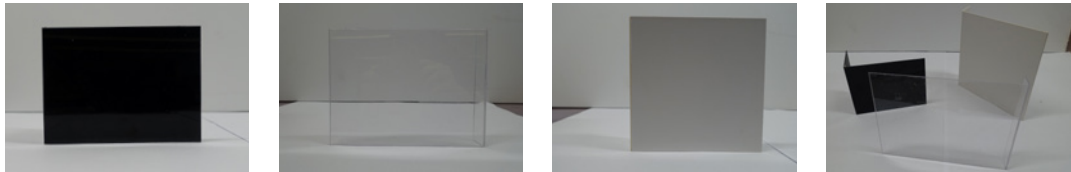


ROOMS

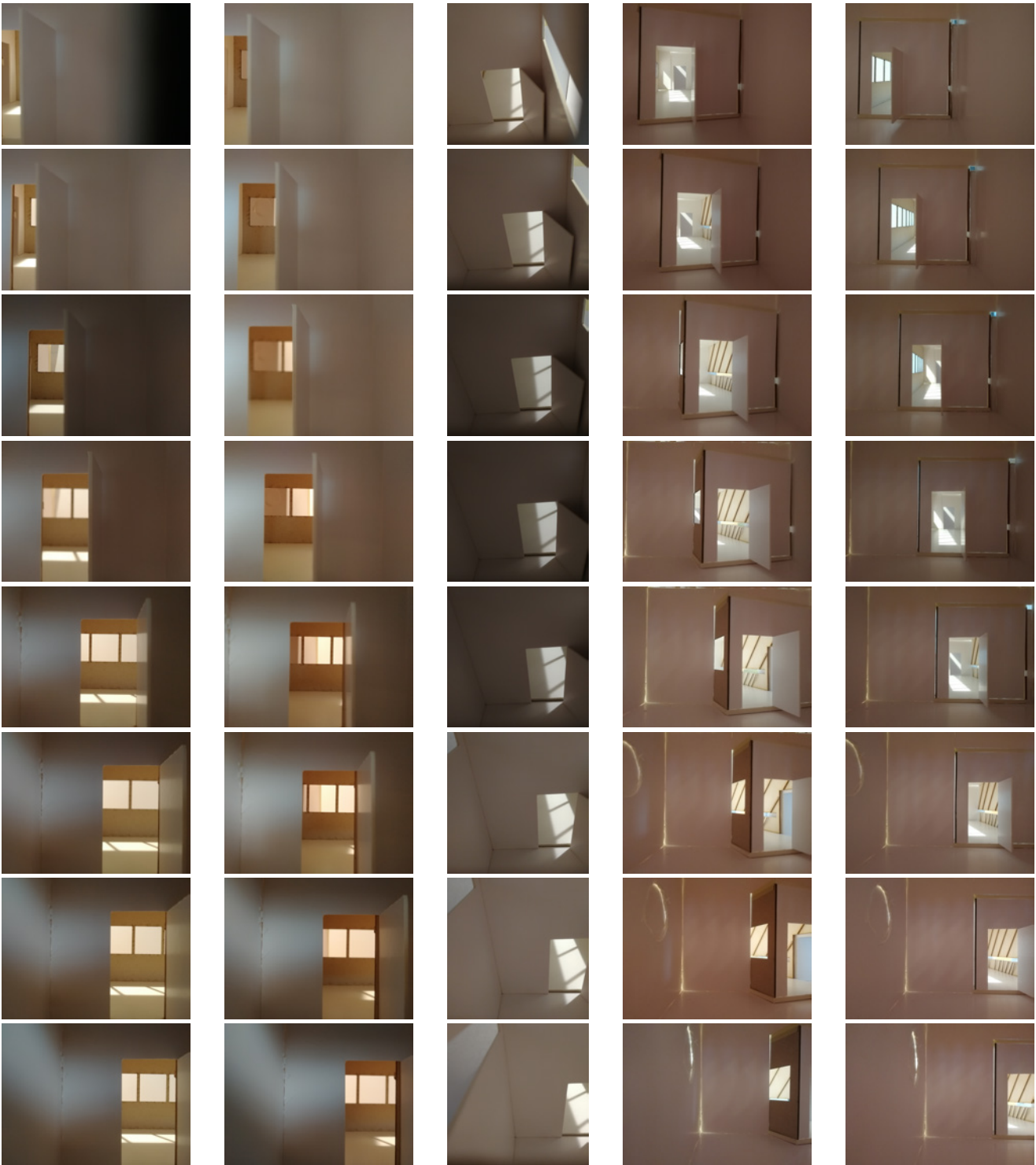
The inner surface of corridor is divided into four parts: touchable area, handrail, touchable area and only visible area. The lower touchable area is designed for children and the higher is for adult. The handrail hides in the wall in case people need something to support themselves.



INTERACTION

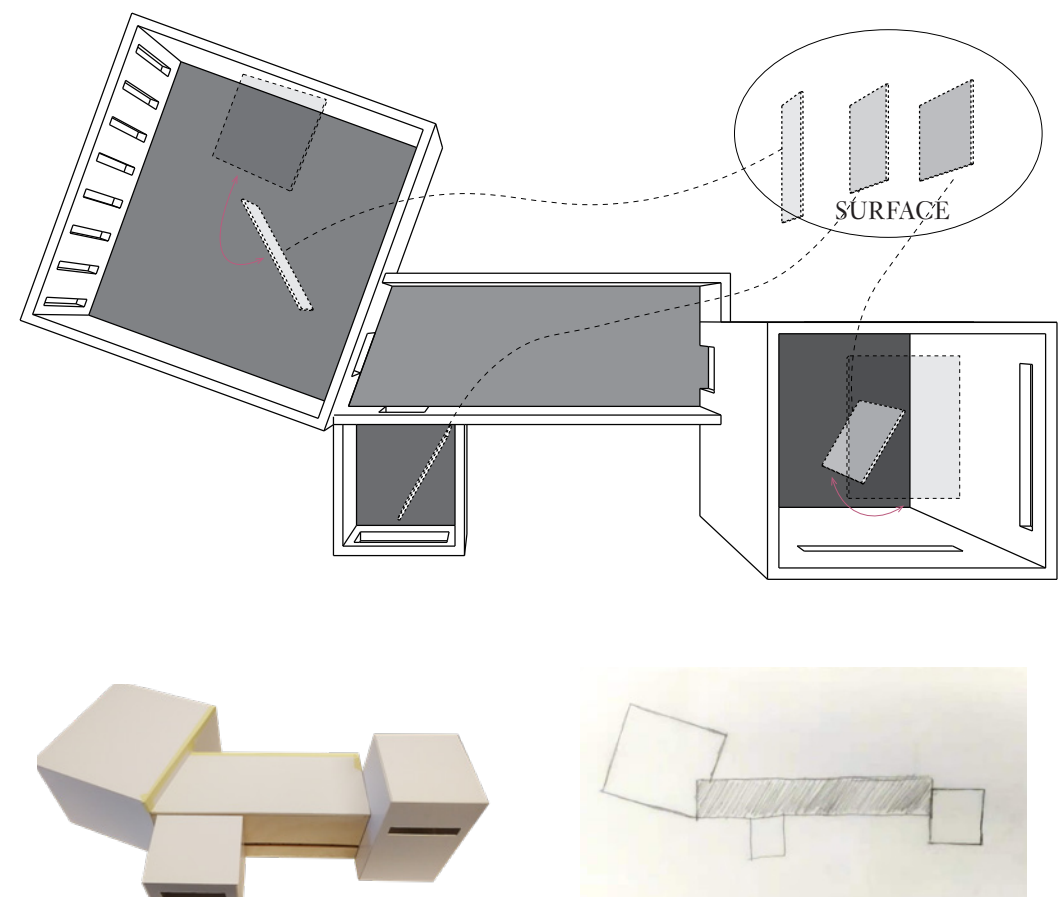


When you are moving from one side to another side, you will see the window firstly and then see the interior wall and the texture on the surface.



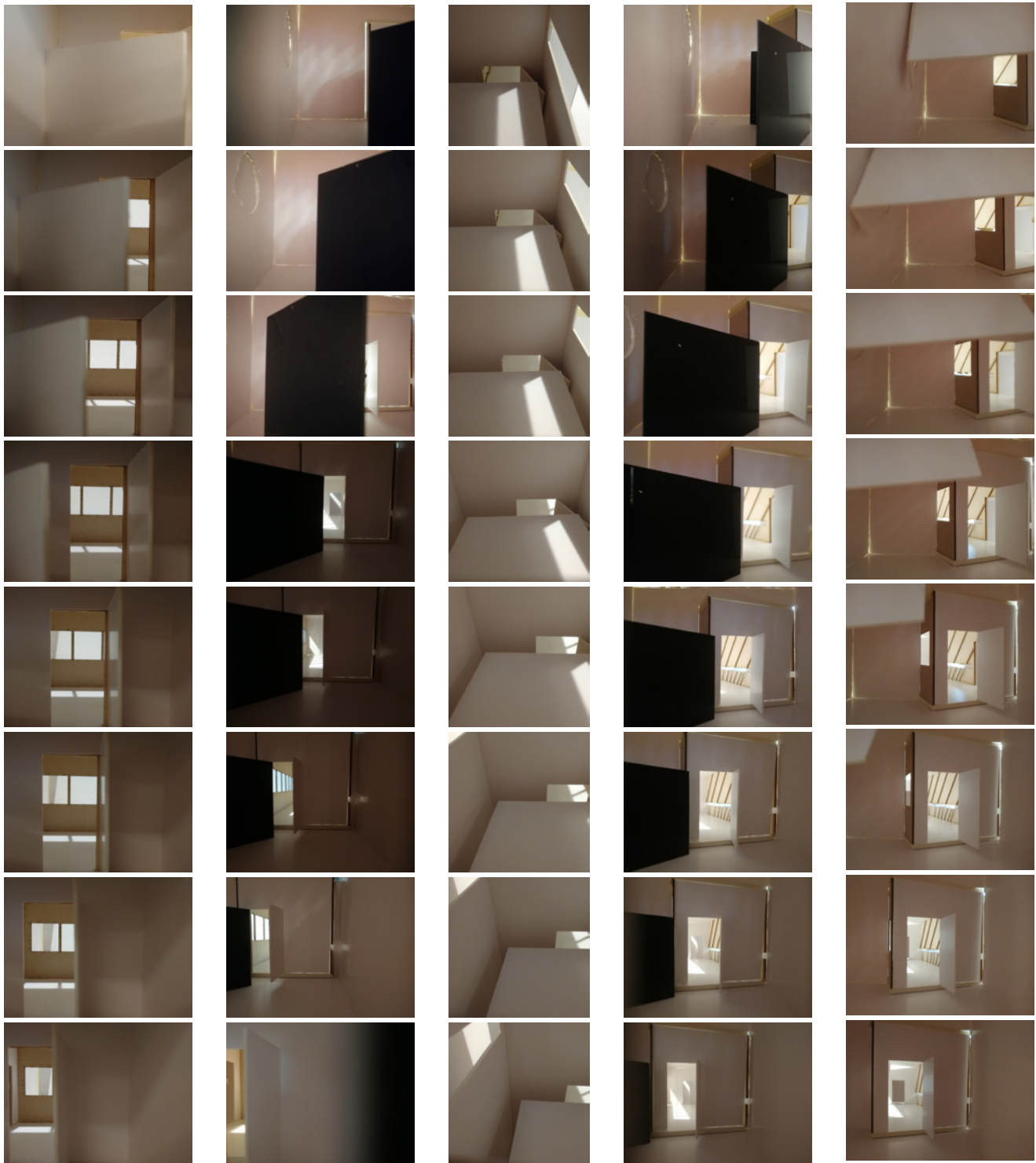
When you move yourself from one side to another side in a room, you will find the space, the light, the view changed. Through this movement, you can get different information to navigate yourself.

INTERACTION



When you moved from one side to another side, you only see the interior wall and the texture on the surface, but you will view a door and know something happen behind the door.

Adding more surface to split space. The situations happened in different rooms will be changed as each room will have its own topic, like vertical surface room or horizontal room.





SECTIONS

Perpendicular



Angled



0 1m 3m 7m

Those four space are connected with each other. When you walk from different direction, you can see different things and enjoy different atmosphere.



0 1m 3m 7m

Rotated room makes the situation happened in the room change, the thing you view is different . The light and the touching change a little bit.

**IV**  
**BIBLIOGRAPHY**

1. Pallasmaa, Juhani(2005). *The Eyes of the Skin: Architecture and the Senses*. Academy Press

2. Pallasmaa, Juhani(2009). *The Thinking Hand: Existential and Embodied Wisdom in Architecture*. John Wiley & Sons

3. Merleau-Ponty, Maurice(2008). *The World of Perception*. Routledge.

4. Zumthor, Peter(2006). *Atmospheres*. Birkhäuser Architecture.

5. Arnkil, H, Pyykkö, S. *Color–light–space: An interdisciplinary course for graduate and postgraduate students*. Color Res Appl. 2018; 43: 857– 864. <https://doi.org/10.1002/col.22284>

6. Michael Asgaard Andersen (2012). *In Conversation: Peter Zumthor and Juhani Pallasmaa*. Architectural Design: Volume 82, Issue 6. <https://doi.org/10.1002/ad.1487>

7.Holl, Steven(2012).*Color, Light, Time*. Lars Müller

'' *What I did is to show people the possibilities to combine research of spatial orientation with their projects. Hope others will be inspired by my article.*

''

Special thanks to Peter Christensson, Morten Lund, 熊少海 and 余慧敏



# Spatial Orientation

Touching the architectural elements by hand

Qing Yu