

Living Forms

Speculative Thinking and Design on Mobile Furniture

Master Degree Project

Zhijian Xiong



LUND UNIVERSITY

*Title: Living Forms
(Speculative Thinking and Design on Mobile Furniture)*

Author: Xiong, Zhijian

Degree Project for Master of Fine Arts in Design, Main Field of Study Industrial Design, from Lund University, School of Industrial Design Department of Design Sciences

Examiner: Lecturer, Anna Persson

Supervisor: Professor, Claus-Christian Eckhardt

2023

ISRN: LUT-DVIDE/EX--22/50657-SE

Acknowledgment

Thanks to Mom and Dad for backing me up and supporting me in perusing this degree far, far away from home. I feel the immense guilt to this day for not being able to come home during the pandemic where yé ye, nǎi nai and lǎo lao all passed away. I wish I could share with them the success of this project.

I would like to extend my appreciation to Claus and Anna, my supervisor and examiner. Thank you sitting and listening my scrambling of ideas and believing in me. Your constant support and encouragement gave me the confidence to explore and formulate all my ideas, leading to the fruition of this project.

I am immensely grateful to the workshop fellows, Josef, Jonny, Bert, Jon, Peder, Karl and David. I remember every single time I come to you with my scattered doodles, looking for help, and every time I get your attention and support. I am indebted to you for sharing your skills and knowledge, which played a vital role in bringing my design to life.

A special mention goes to Violet, whose support has been instrumental in keeping me grounded and motivated. Your ability to piece me together, time and time again, is something I will forever cherish.

Lastly, To all my fellow classmates and friends, you'll always have my respect, for your sometimes challenging, always smart input and suggestions. I feel the regret not being able to be as inspiring as you all have been to me.

This project is a hard one. I can barely recall how many nights I had my eyes wide open in anxiety. It was my luck to have you all.





Abstract

This project is about imagining new ways we live at home, and new objects to take place.

The project is based on personal interests, short case studies, and observation on current human conditions. The major concept was developed with constant attention on the mobility of domestic furniture, and how this general concept shape shifts to manifest different ideologies of different backgrounds. In the realization of social crisis today and its deterioration further into the 21st century, the project highlights the degradation of functions and resources urban space can provide for individuals, thus the proposal for an living environment with implemented furniture that enhances interaction with physical, and active use of domestic spaces without overly relying on the outside world and the globalization logistics.

The project's realization is a shelf + hanger unit(Named Living Form #1) with two critical features: The relocation of storage spaces, and the reinvigoration of hanging and suspending. The Prototype reflects a short chapter of the greater narrative and will be continued as part of the author's aspiration.

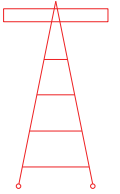
1



7



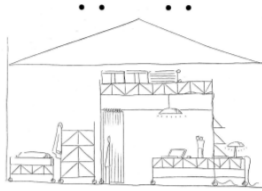
13



2



8



14



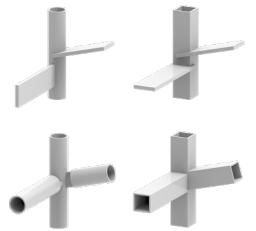
3



9



15



4



10



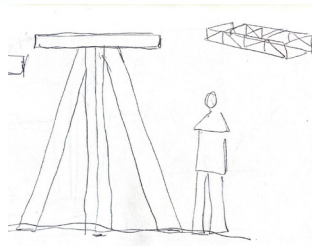
16



5



11

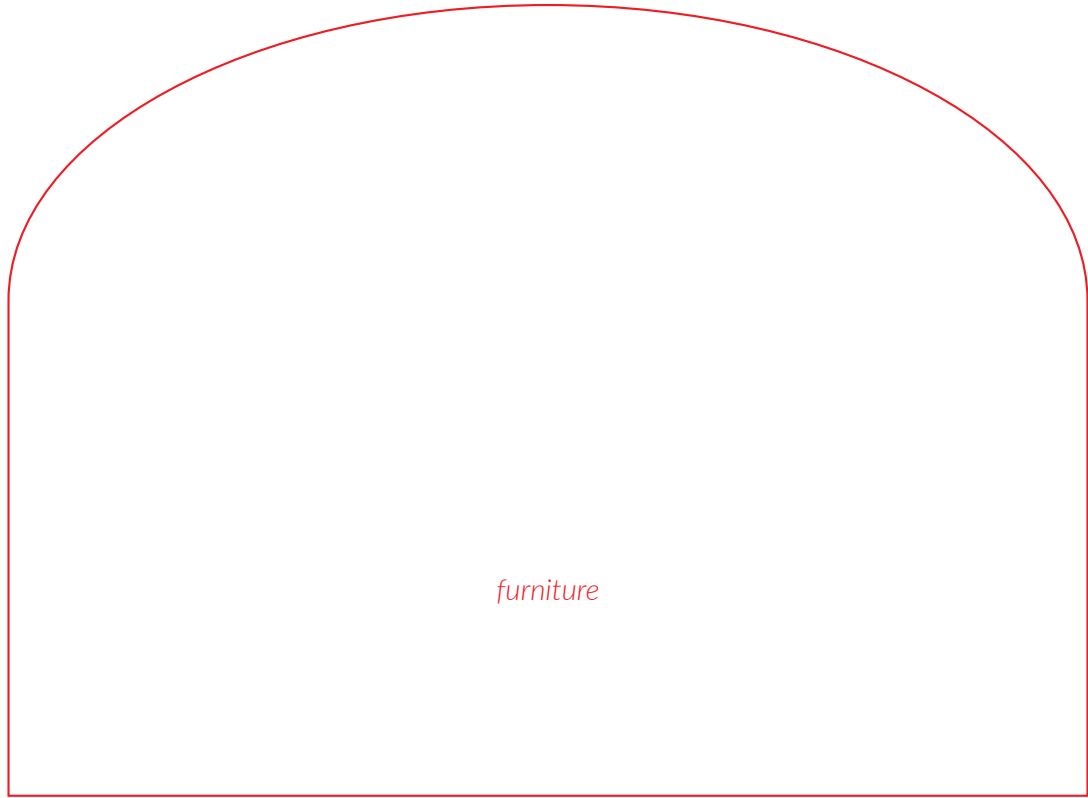


17



Content

1	Project Introduction	p06
	1a Motivation	p08
	1b Mobility	p10
2	Research: Historical Context	p14
3	Case Study #1: E-1027	p16
4	Case Study #2: Nomadic Domestic	p18
5	Case Study #3: Pao Projects	p22
6	Research Reflections	p26
	6a Hierarchy in Domestic life	p28
7	Other Input	p32
8	Proposal: Living Forms	p38
	8a Living Forms	p38
	8b Rearranging Storage	p40
	8c Hanging	p42
9	Ideation Approach: User Case or No?	p45
10	Sketch Group 1	p50
	10a Challenge	p54
	10b Adaptation	p56
11	Sketch Group 2	p58
13	Living Form #1: Shelf and Hanger	p68
	13a Workflow and Goal	p70
14	Full Scale Mock up	p72
	14a Reflection	p74
15	Form and Construction	p76
16	Finalizing	p78
	16b Parts and Drawings	p80
	16c Final Prototype	p90
	15d CMFs	p96
17	Project Outlook	p101
18	References	p102



Can I imagine a domestic space where all furniture units are on wheels and never really stop?

Motivation

While this degree project concluded my master-level study, and drew a faint line between the part of my professional career as a servicee (being educated and facilitated by school) and a servicer (designing for clients), I had the intention to take advantage of creating for myself through contemplation a rough picture of what kind of space I, as a client #1, wish to live in. That picture should serve as a ground zero in my future endeavor for brewing serious debates with myself and others, and offering concrete ideas to the human subjectivity. In this approach I seek to achieve self-accomplishment as a designer, foreseeably through many revisions and turn-overs.

My education in art and design firmed my interest for objects in human spaces (Inclusively speaking: furniture, lighting, and all accessories that can be integrated into our living environment) because of their possibility and my liberty to step out of the consensual problem-and-solution logic loop during the design process. A good part of societal progress, I still believe, is founded outside of human rationale. And for this project, I wanted to start with an irrational thought, and then realize the idea into a valuable concept. After that, I want to use my time to prototype some designs that speak to people.

Having been Lived in mostly rental housing for almost past 10 years I found myself constantly with the urge to rearrange the furnishings provided by the owner. And the longer the interval the more difficult I realize

the rearranging process is, as hoarded items take up space, and things get fixated on walls and ceiling. The traditional compact interior, as well as the mindset of dwellers, have the tendency to stagnate over time. Hours of effort are then needed for re-activating both. One question comes up to me: Can I imagine a domestic space where all furniture units are on wheels and never really stop?

The question of mobility becomes more intriguing with variables in concept development. It can either lead to the aesthetic argument where traditional domestic furniture's cozy and soft language learn to co-exist with the industrial moving compartments, i.e. caster wheels, or research of certain new action/ experience in this imagination, or furthermore, a discussion of new furniture typology in relation to the space. Is chair still a chair, and shelf still a shelf? At this point the question proves its potential theoretical depth and suitability for a project of this scale. Further contextual information need to be gathered and examined.

Mobility

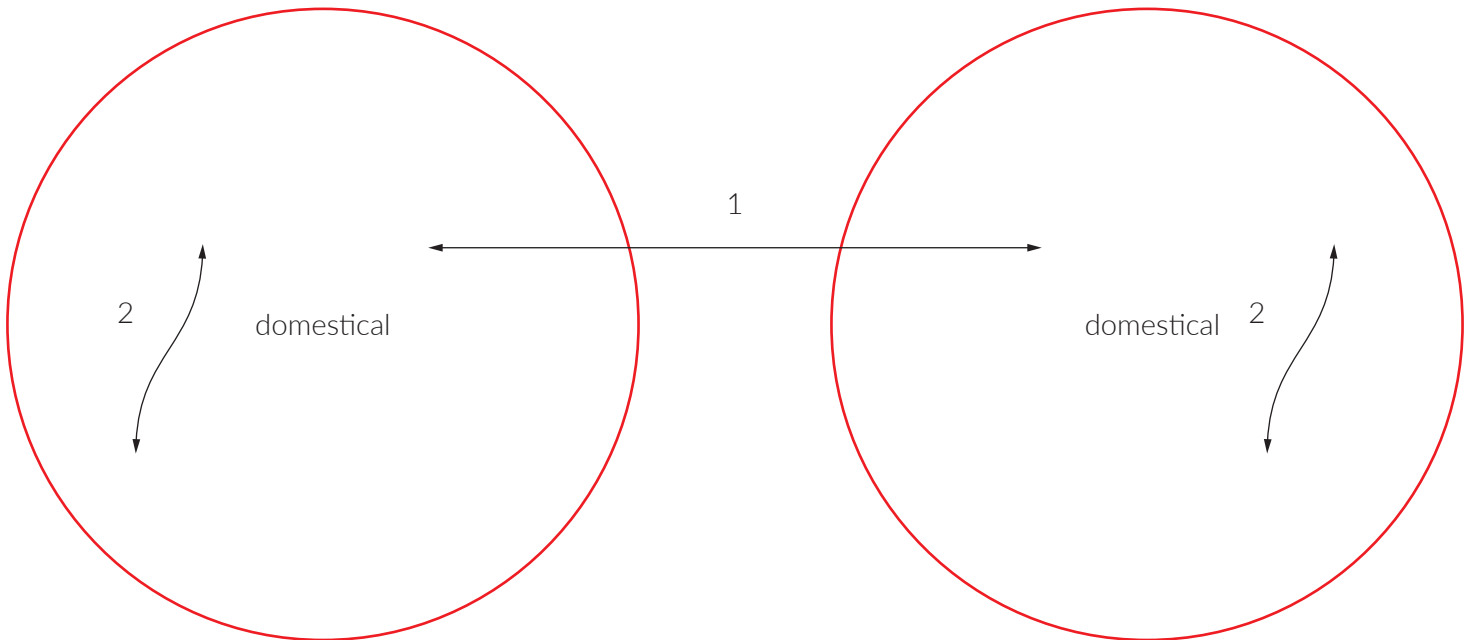
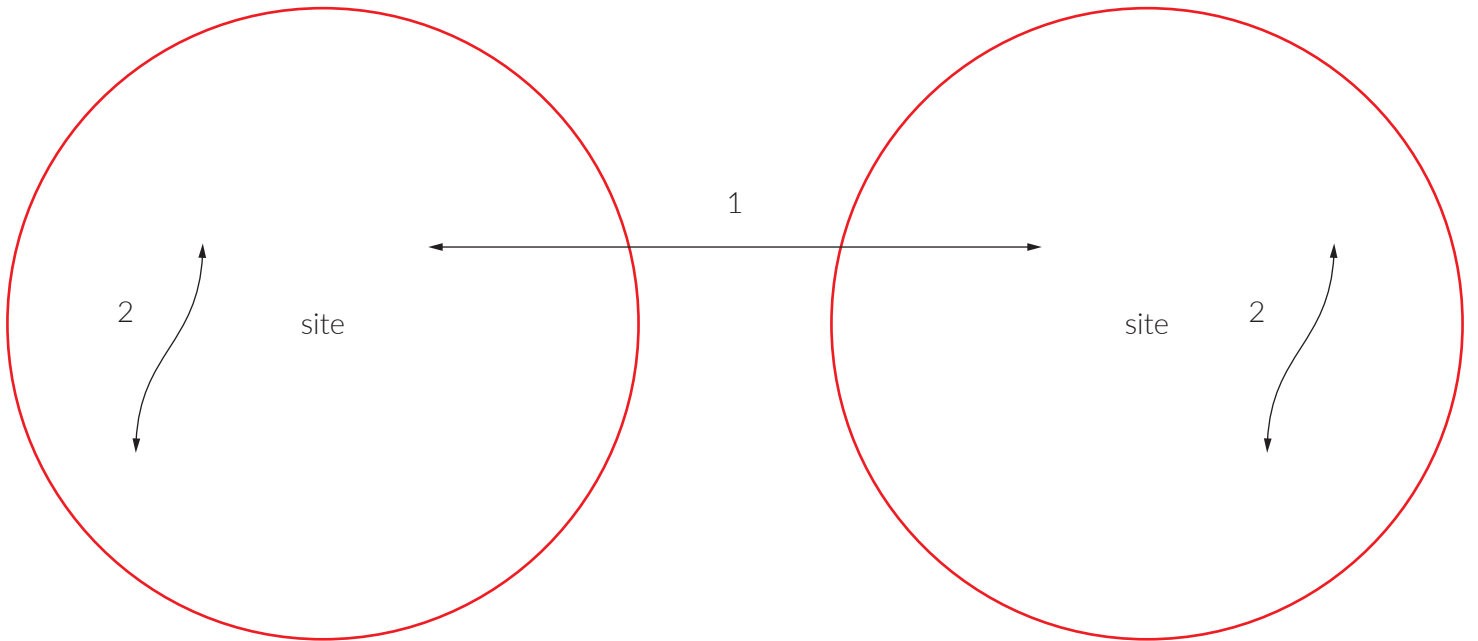
To explain the concept of “mobile furniture”, some clarifications of term are needed before taking any further step. Furniture, to most people are consumer products, which can be described as mobile of different notions. In one example below, I differed them into two basic categories. This difference should be carefully examined and then decided at the early stage of the project for less confusion and a good project zoom-age. Noted that the categories mentioned here have no priority of importance, each of these two can be worked on independently and deliver good design result on its own.

1. Mobility referring to the process of moving from one place to another. Furniture is kind of object, in most cases, larger in both format and scale than other consumer products. Due to this nature, the transportation of furniture should be discussed in separate and detailed cases. When noted as “mobile”, a piece of furniture can indicate the efficiency of transportation during one or many stages of a consumer cycle, i.e. producer to seller, producer to domestics, seller to domestics, etc. Mobile furniture, in this case, can be designed as flat-packed, collapsed, or in light-weight material so the transportation of the furniture becomes relatively easier than those without these characteristics.

The place-to-place mobility can also indicate the packing and moving during the place moving process on customer side. Similar to previous case, mobile furniture designs can simply inherit some characteristics mentioned above.

2. Mobility referring rearrangement in one place. We have all been through this: trying to move chairs around the table so more guests can be gathered, or moving the sofa to another corner to make space for that new shelf, the list can go on endlessly. In design works, the term mobility refers to the ability to comfortably reposition or rearrange furniture within a space without too much hassle, and to suit different purposes or spatial configurations. This type of furniture mobility is often seen in urban or residential settings where individuals may have limited space or a desire for flexibility in their living arrangements.

This project for the absolute most part discusses mobility of the 2nd notion (moving within one space) in close relation with the project’s initial interest (adding caster wheels on that lounge chair does not really help to carry it from IKEA back to your home). And furthermore, the difference in how long of a distance the moving takes place, the 1st notion emphasizes efficiency, which tend to be measured and evaluated objectively, while the 2nd notion highlights versatility, in which subjective opinion and personal value/experience play bigger roles during the creative process.



- 1: Mobility referring moving to another place.
- 2: Mobility referring rearrangement and reposition in one place.

Historical Context

The concept of mobile furniture has been a topic of discussion and exploration for a considerable period, but it gained significant attention and popularity during the 20th century. The period between the late 19th century and the early 20th century witnessed notable shifts in design philosophies and lifestyles, which prompted the exploration of flexible and adaptable furniture designs.

One movement that played a pivotal role in shaping this concept was the modernist movement in design and architecture, which emerged in the early 20th century. Modernist designers aimed to create functional and efficient living spaces characterized by open floor plans and a desire for versatility in furniture arrangements. During this time, the idea of furniture that could be easily moved and adapted to different functions or spatial configurations became a subject of great interest¹.



Scale model of Maison Dom-ino, c.1914, Le corbusier. ©FLC/ADAGP

Le Corbusier, a prominent figure in the field, introduced one of his most significant contributions, the five points of architecture, during the 1920s. One example from these points is the use of pilotis, thin load-bearing columns that separate from stagnant wall structures, emphasizing the collective effort to free up interior space and enable more creative freedom in designing interiors².

In the mid-20th century, as post-war housing shortages and the need for efficient space utilization became more pronounced, discussions around adaptable furniture gained even more prominence³. Designers and architects such as Charles and Ray Eames, Alvar Aalto, and George Nelson experimented with modular furniture systems and multi-purpose designs, allowing for easy rearrangement and adaptation to changing needs. The concept of flexible and adaptable furniture has since evolved and continued to gain prominence, with advancements in materials, technology, and manufacturing techniques enabling the development of innovative designs that offer mobility and adaptability to suit the evolving requirements of modern living spaces⁴.

The research goal is to collect valuable contextual information that presents compelling arguments, combined with my existing knowledge, experiences, and values. Studying past design practices is essential to achieving this goal, as it not only clarifies vague understandings but also provides informative stepping stones that connect to previously unnoticed concepts and designs. This documentation presents a series of concise case studies:

The first case study focuses on the E-1027 villa as an early manifestation of mobile interiors in modern society, with specific attention given to the furniture design in this instance. The second case study delves into mobile domestics in pre-industrial society, highlighting the nomadic cultures of the Asian Steppe as a relevant example that demonstrates prophetic ideas in mobile designs. Lastly, the third case study examines Ito Toyo's Pao projects in recent decades, which can be seen as an appropriation of nomadic culture through contemporary lens. Additional conceptual and visual inspirations are mentioned in a subsequent section.



ESU (Eames storage unit), c.1949, Charles and Ray Eames © 2011 Eames Office LLC (eamesoffice.com); © Herman Miller, Inc. Photo © 2011 Museum Associates/LACMA



Villa E-1027 interior

Case Study #1: E-1027

The E-1027 villa serves as a significant case study, showcasing how designers in the early modernist era interpreted the mobility of furniture. Designed by Irish architect and designer Eileen Gray in collaboration with her husband Jean Badovici during the early 1920s, the villa demonstrated a range of ideas for customizing the interior according to Gray and Badovici's specific needs⁵.

The concept of mobility is evident in the design of the furnishings. The furniture pieces catered to their requirements, including both models that were later mass-produced, such as the E-1027 side table and the Transatlantique lounge chair, and unique designs exclusively found in this house. Noteworthy examples include the roller for carrying the record player, allowing music to be enjoyed in flexible locations throughout the house, and the shaving mirror for Badovici with a movable arm, making it easier to shave the back⁶. Alongside the villa's thoughtful arrangement of indoor space, the design of E-1027 reflects Gray's emphasis on living comfort in an unconstrained manner. The mobile furniture designs, later described as "camping style" in relation to Gray's collective works, exemplify various approaches to incorporating mobility, whether through lightweight construction, transformative features, or movable compartments.



Case Study #2: Nomadic Domestic

It is also tempting for this very research topic to shortly look at mobile domestics in a larger historical context. The concept of mobile domestic experience in pre-industrial age not only have existed, but famously represented by the nomadic cultures and their living habit. The most well-known case is traditional Mongolian tent-like dwellings, known as Ger or Yurt.

Nomadic Mongolians, Turkomen, Kazakhs, Uzbeks and Kyrgyz for long occupied the Asian steppe that stretches from the Caspian Sea to Mongolia, where common construction materials such as



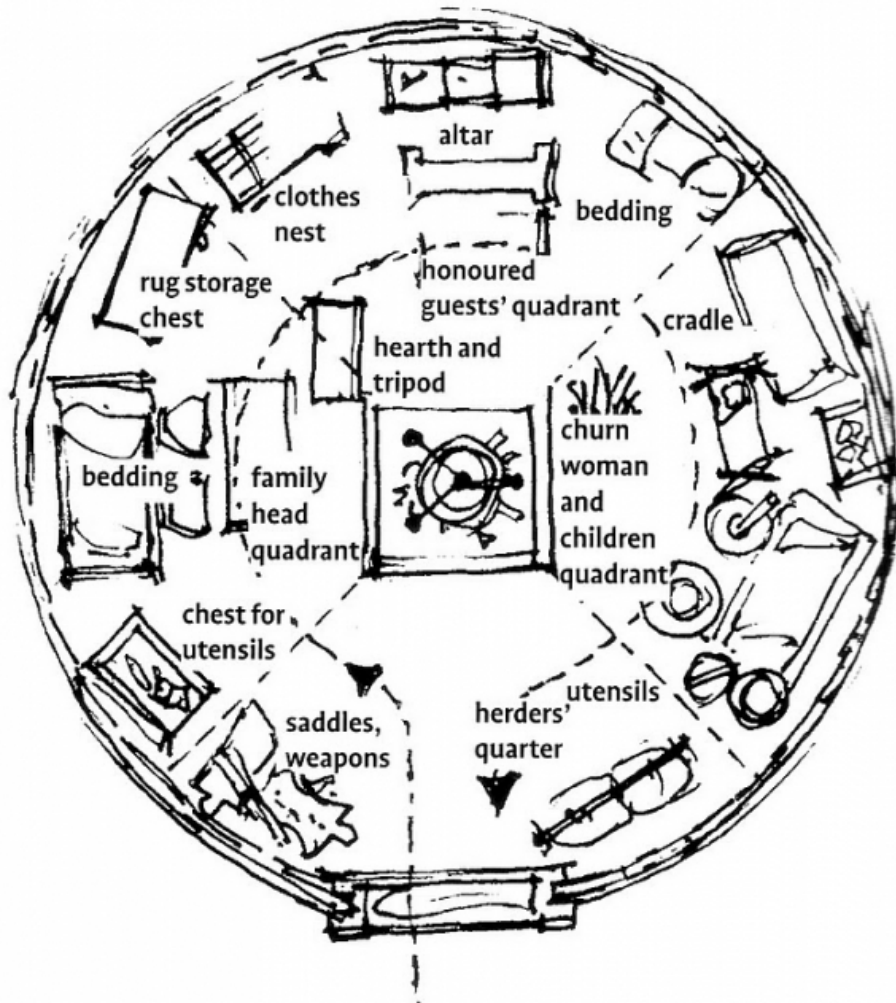
lumber and stone are difficult to gather. Under such circumstances, the habitants depended on animals and livestock in various aspects, including food, clothing, as well as shelter⁷. Ger is designed to be portable and can be easily assembled/disassembled, making it suitable for a nomadic lifestyle where the efficiency of moving critically affects well beings. It also serves as a multi-functional living space that accommodates the according lifestyle, and provides protection from harsh climates of the region.

The interior of a ger has no walls or divisions, at least visually. The furniture in a ger is typically lightweight and portable and usually designed to be compact and small-scale to maximize the limited space available. Seemingly, the nomadic lifestyle and interior and the modern calling for domestic mobility echoed with each other.

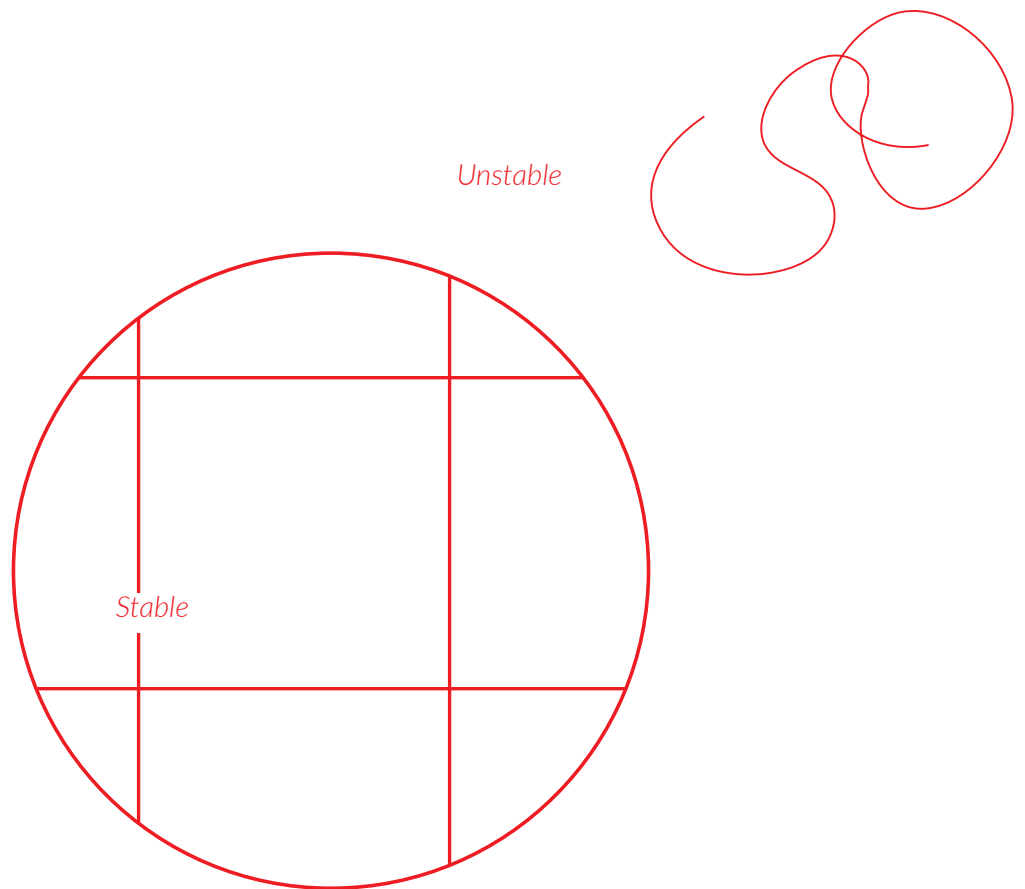
However, if to take a closer look at the conceptual foundation of modern designs, the emphasis is often on open and flexible spaces. Divisions and walls are actively minimized or eliminated to create a sense of flow and openness. The idea is to allow for versatile use of space, accommodating various activities and adapting to the changing needs of the inhabitants. On the other hand, the traditional ger has a distinct division of space into four corners, as illustrated on the right. The ger's interior is traditionally organized with specific areas designated for different purposes. The rear corner of a ger is considered the most sacred and is reserved for important and respected guests. The front of the ger is typically the area for cooking and the stove. The right side is often designated for male family members, while the left side is for female family members⁸.

This division of space in the ger is influenced by cultural and social norms, as well as the practical needs of the nomadic lifestyle. But more importantly, the action of mobility for traditional nomadic living takes place more on the outside of the domestic, while in modernist understanding, mobility represents the reaction to what's within. The construction material and furniture units in a ger are designed to be lightweight and portable indeed, but the purpose behind is to facilitate the moving effort of the whole domestic unit when the dwellers relocate on the vast steppe. It is reasonable to believe that if all the confinements that historically nurtured the characteristics of a ger disappeared, namely the scarcity of wood and stone, and the dependence on traveling animal and seasonal hunt and gatherings, the Mongolian living units would have possibly appeared more similar to traditional housing in agricultural civilizations.

The attention to the traditional nomadic living, however, lead me to design examples where designers try to appropriate traditional nomadic culture through design. The following case, which took place in Japan in the 1980s, becomes the center of debate for my degree project and eventually helps me building up a conceptual model for the proposal.

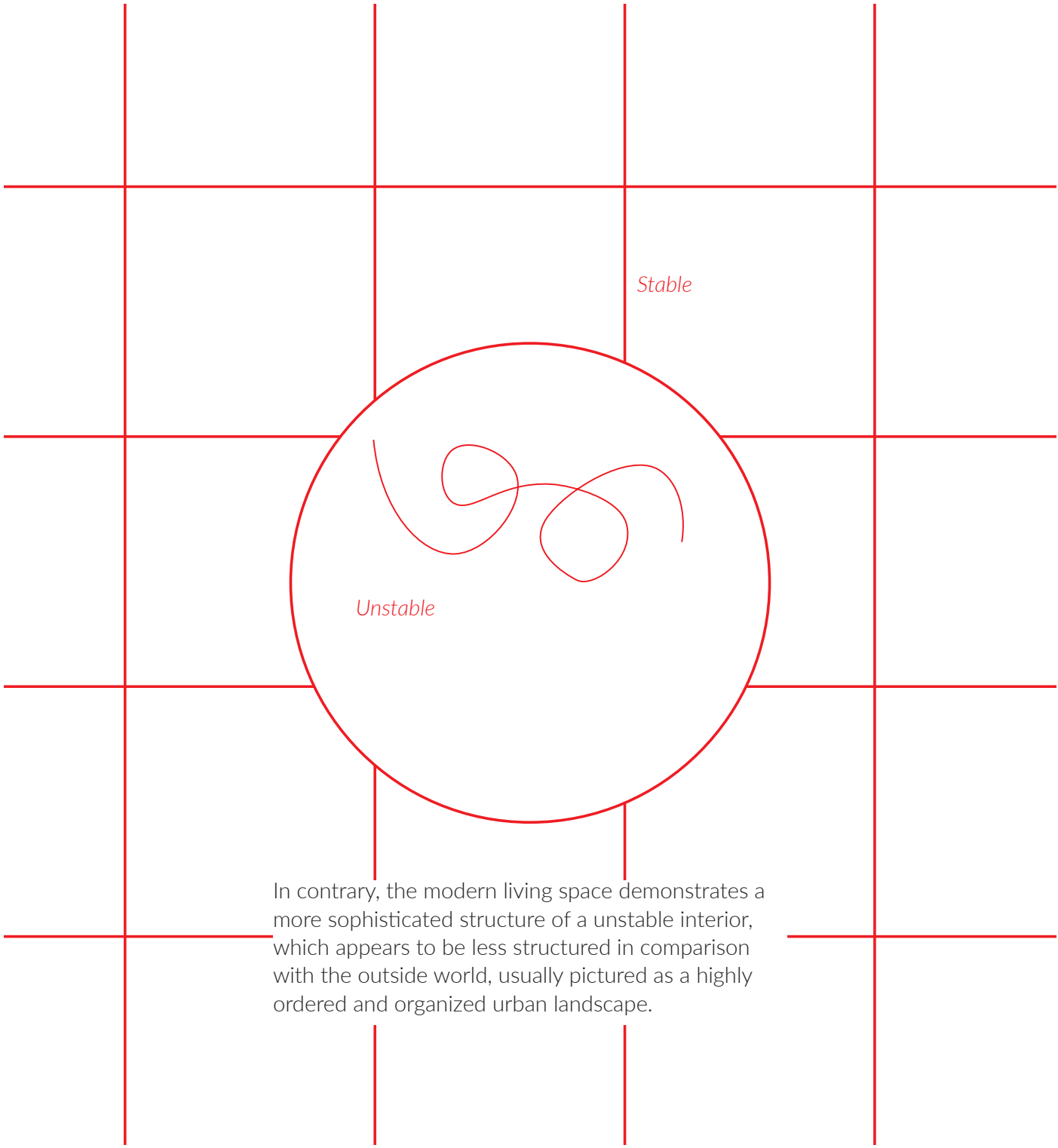


A typical plan for a traditional Kyrgyz yurt, 2010. Image by Paul Oliver.



For traditional nomadic housing, the grand outside living environment is the source of unpredictable, and attributes to the need for constant relocation. The effort to construct a moving tent shows the intention to construct a stable living unit that can be efficiently packed and moved, echoing with the earlier clarification of the term as the place-to-place mobility.

What sets this apart is that the notion of mobility encompasses not only the objects within the interior but also the interior itself, emphasizing the comprehensive mobility of the nomadic lifestyle.



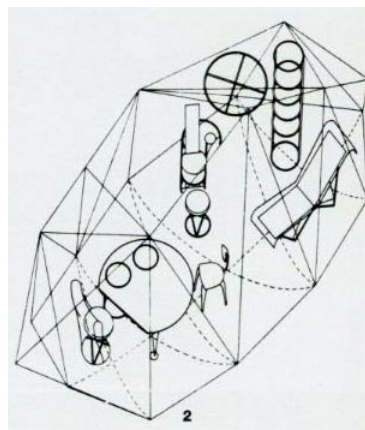
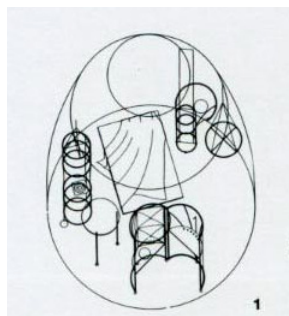


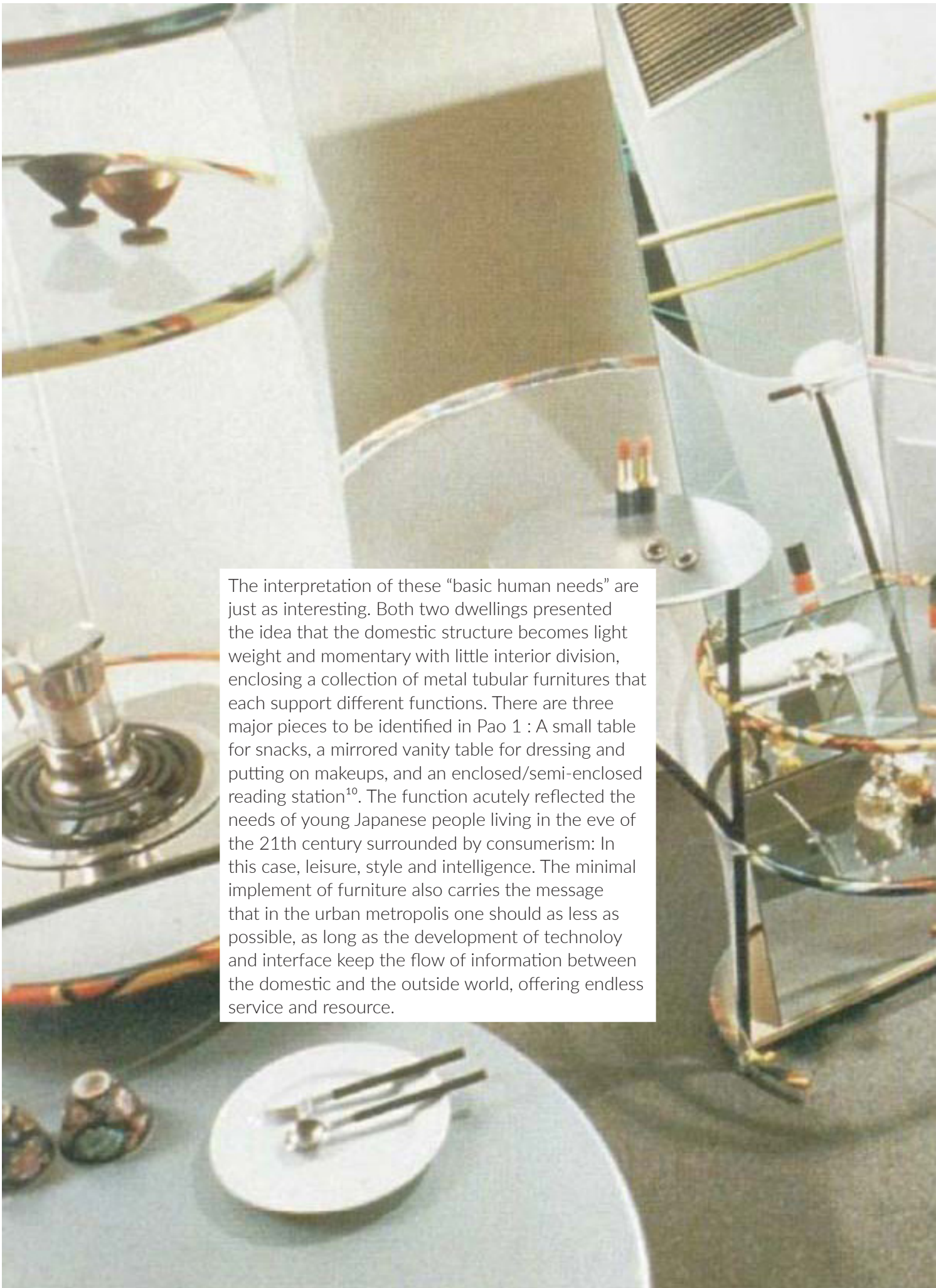
Tokyo Nomad Girl Kazuyo Sejima and furniture in Pao 1, 1986. Image by Tomio Ohashi.

Case Study #3: Pao Projects

Pao I and Pao II (1985 and 1989) are two projects created by the renowned Japanese architect and designer Toyo Ito. These projects envision a scenario in which the traditional domestic functions such as eating, shopping, and working have become dissolved within the metropolis. In this vision, the living unit itself is stripped down to its essential function of providing minimal shelter and facilitating access to the informational network. These works represent Ito's projection of an ultimate form of urban domestic life, offering a glimpse into his perspective to urban living during the 1980s⁹.

The name "Pao" (包/パオ) phonetically refers to the name of nomadic ger and yurt in East Asian languages. And accordingly, the design can be interpreted as an appropriation of the cultural symbol, which reflects a narrative, that the urban complex to its dwellers expresses similar characteristics of nature to traditional nomads. As the people who live in the city depend their well-beings on resource and service provided by the outside, Ito imagined that the people should carry minimal physical material in their home except those for basic human needs.





The interpretation of these “basic human needs” are just as interesting. Both two dwellings presented the idea that the domestic structure becomes light weight and momentary with little interior division, enclosing a collection of metal tubular furnitures that each support different functions. There are three major pieces to be identified in Pao 1 : A small table for snacks, a mirrored vanity table for dressing and putting on makeups, and an enclosed/semi-enclosed reading station¹⁰. The function acutely reflected the needs of young Japanese people living in the eve of the 21th century surrounded by consumerism: In this case, leisure, style and intelligence. The minimal implement of furniture also carries the message that in the urban metropolis one should as less as possible, as long as the development of technoloy and interface keep the flow of information between the domestic and the outside world, offering endless service and resource.



中野: 休むところは必要ですし、化粧したいし、食事はとりたいし、情報も手に入れたい。それが、都市に生きる現代女性のリアルなところですよ¹⁰。

NAKANO: "I need a place to rest, I want to put on my makeup, I want to eat, and I want to get information. That is the reality of modern women living in the city."

-Neuroscientist Nobuko Nakano on Pao's furniture design, in conversation with Ito during the office visiting. Vogue Japan, 2022



Reflection

Through my case studies, I have observed that while the fundamentals of mobile furniture are similar, the manifestation of the concept can vary under different contexts, functions, or cultures. This understanding has sparked my interest in examining these ideas through the lens of my own experiences as a modern individual. This line of thinking has ultimately shaped the goal of my degree project: to reflect an idea of mobility based on the contemporary domestic narrative of my generation.

Ito's concept, among other research materials, appears to be the most relevant on this direction. It is close to being prophetic that the progressive vision coincided with my personal experience growing up, witnessing technologies and gadgets being rapidly implemented into the domestic life of this generation, and the globalization logistics becoming so highly developed that people nowadays are consuming goods and services hemisphere away from their living environments. Meanwhile, on the other hand, the gap between living and producing become ever so large that the loss of skill is evident in younger generations. When three meals of a day can be delivered to door with a similar cost of money and with way less input of time and effort, it has been taken among my childhood friends as a leisure material that more younger generations have become bad cooks, or at least very likely to be less proficient compared to their parents. While this observation does not necessarily justify reviving traditional values and practices, it raises concerns about the initial emphasis on domestic mobility, which encompasses the intuitive versatility to adapt.

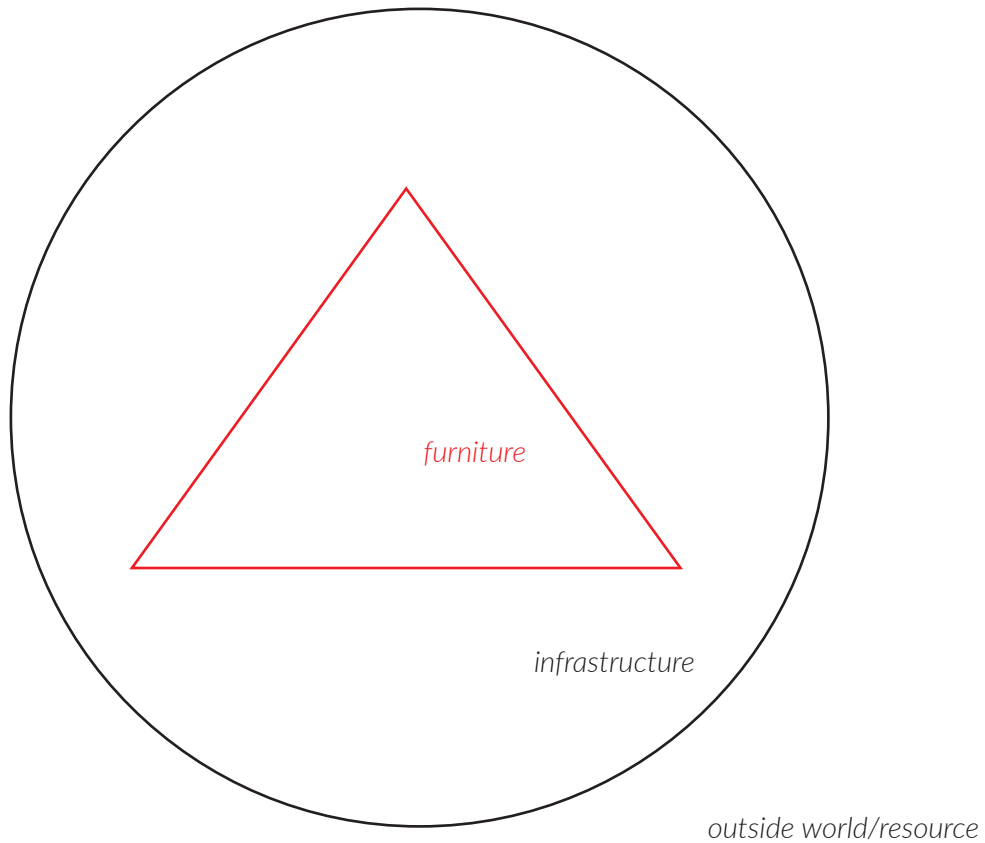
As Ito and many other designers in recent generations pointed out, that we should view urban metropolis as a kind of natural habitat because of their sheer complexity. It is reasonable how the Pao projects become a design endeavor that investigates a kind of source action, as if contemplating a hypothetical situation where a bunch of medieval nomads have been portal-ed and dropped in late 20th century Tokyo, how would they build their shelter to survive. However, his perception of the metropolis, in the big picture of high-level economic achievement and social welfare, expresses a sense of the abundance of resources and the optimism that the urban habitat, exactly like other natural ecosystems, is highly stable and can maintain self-balance and sustain on its own in most cases. We know that this statement holds true no more.

It is needless to say that we are facing many severe consequences of different societal crises 20 plus years into the 21st century, coming from environmental, economic, political, and public health. The city we live in shows its shorthand on the infrastructure level, revealing a sad truth that the city is far from stableness and far less than the infinity pictured by previous generations. The imperative today is to rethink how domestic space should be integrated for a true kind of mobility.

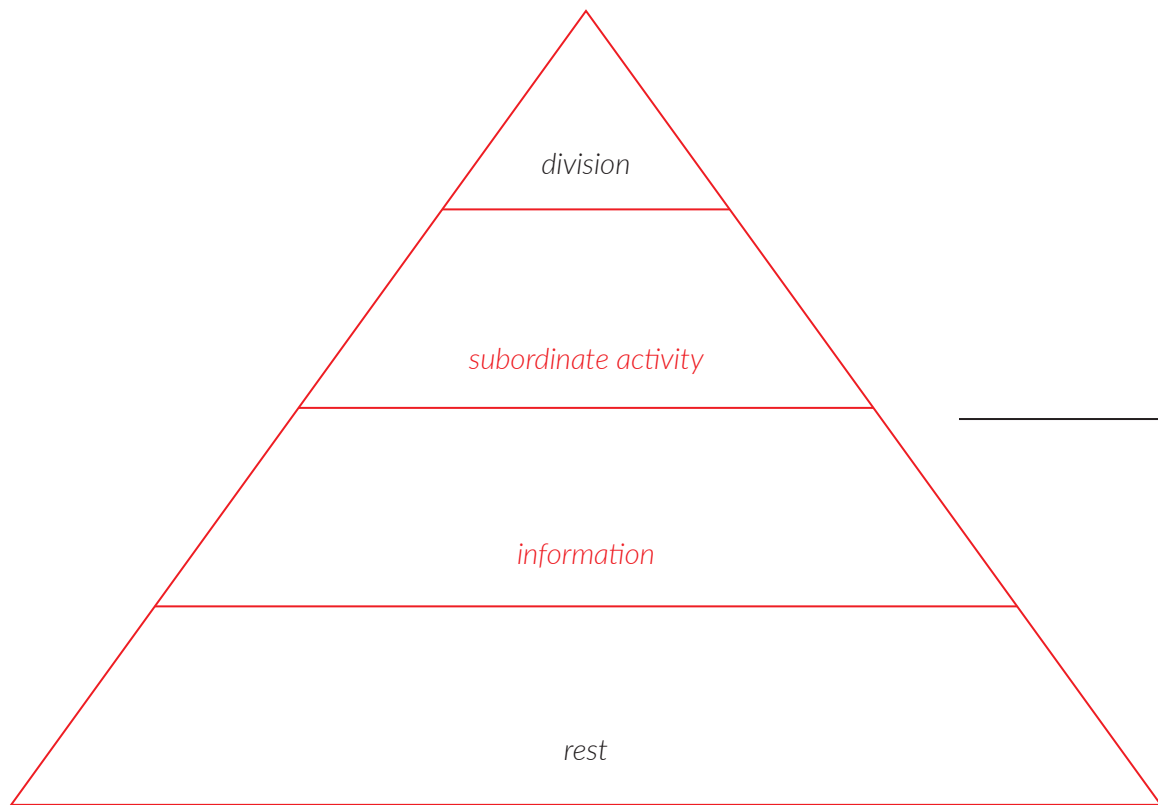
The designed image of the two Pao projects becomes fragile when considered alongside our evolving understanding of the metropolis, particularly due to its lack of support for physical production and storage. In the face of the crises we are confronting, these elements should contribute to individuals' ability to absorb social impact and provide limited but valuable possibilities for self-reliance and independence from the urban ecosystem.



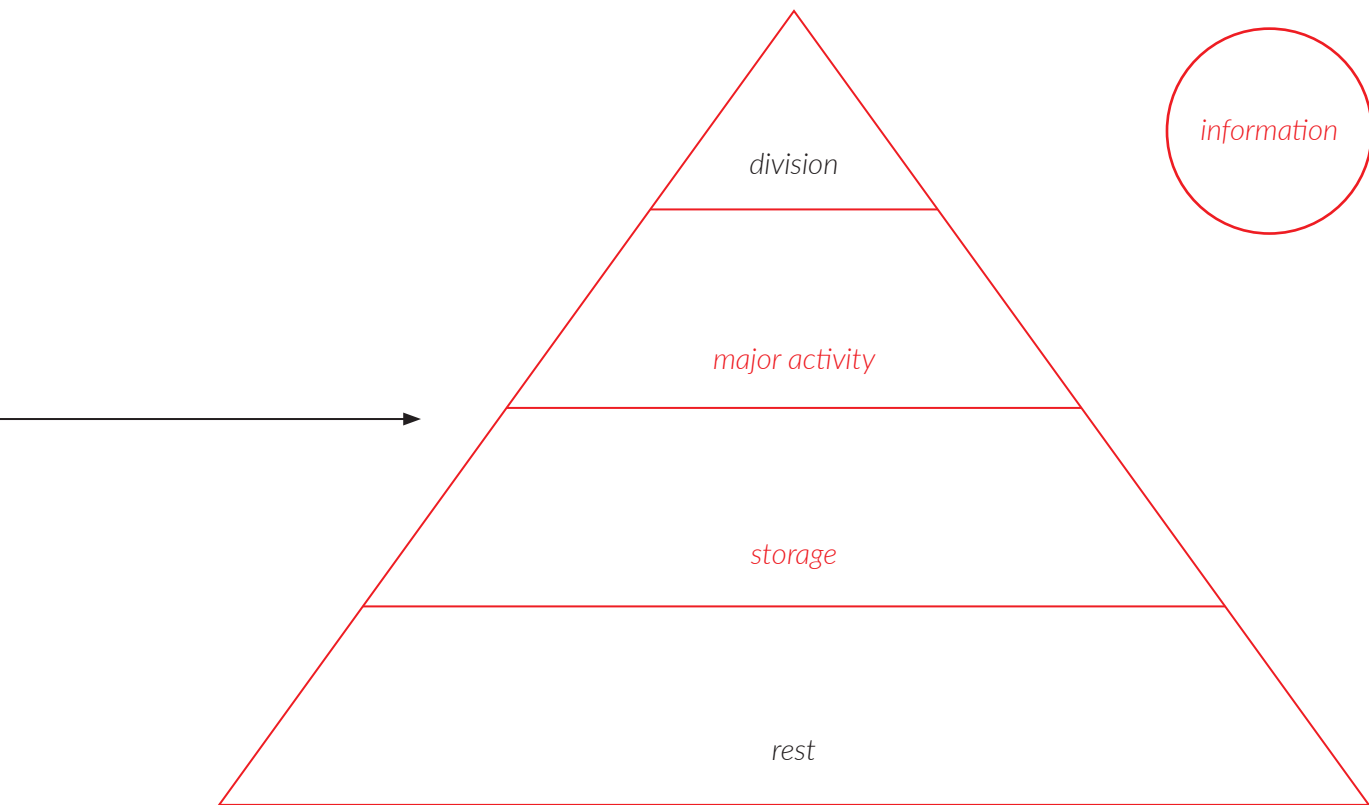
The discussion surrounding the design of furniture ultimately delves into a question of prioritization—determining what functions are more important and what functions are less important. To aid in this exploration, the accompanying visual provides a categorization of functions supported by various pieces of furniture, structured in a pyramid format resembling Maslow’s hierarchy of needs. This visual representation served as a guide in shaping my own understanding of mobility within domestic spaces. It is important to note that while the hierarchy presented in the visual draws inspiration from Maslow’s model, it does not mirror the exact concept, which arranges categories from essential needs to more superficial ones.



Another clarification should be declared in terms of the span of discussion. As the project focuses primarily on the furniture and not quite the space and system, the infrastructure part that provide necessary resource to the domestic space, namely water, electricity, waste circulation, etc., will not be included. The case of mobility, in my design case happens in the preset where basic requirements of survival have been met.



Take Pao projects as an example: Besides the very basic function of a domestic interior that provides a safe place to rest, Pao prioritizes information as the most important part of urban nomadic life. It is the backbone that should make sure all the domestic demands are being delivered to the metropolis system and then delivered to individuals. There are activities that take place in this space, but as observed, only serve as a subordinate part of life. The least important part of the furniture in Pao's design is the division of space and assigning specific areas with specific purposes, which is almost absent in this case. The dwelling does not feature noticeable storage except those that support the information interface (magazine, technological screens, etc.)

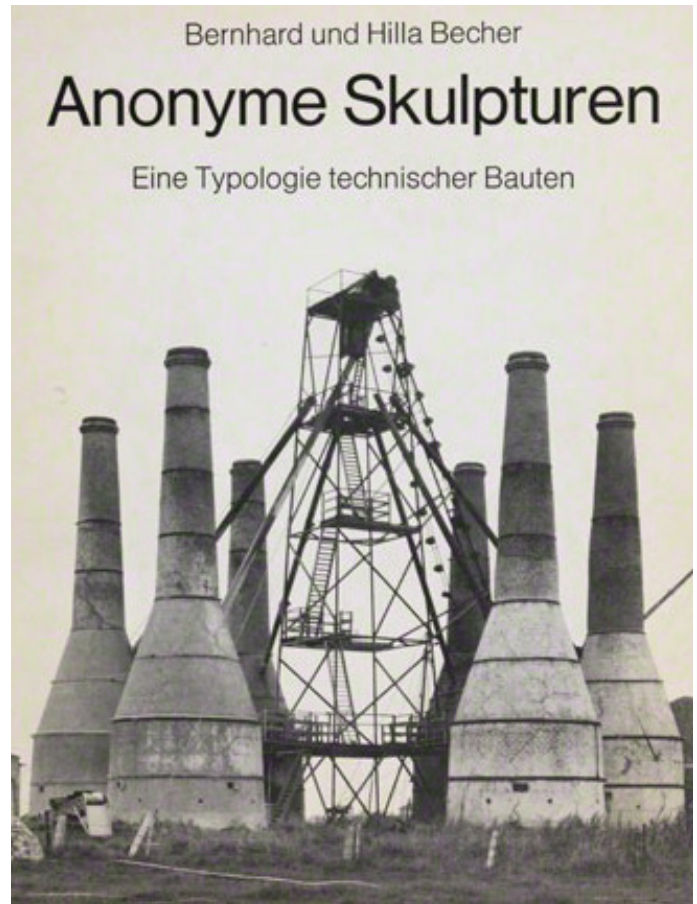


Alternatively, in the contemporary context, a change of priority can be imagined: More physical supports are present, including major storage units and large utility surfaces for varieties of activities such as cooking, dining, working, and entertainment. Information becomes an optional part. The established characteristics of a mobile domestic space remain unchanged, providing basic shelter in an open, division-less space.

This model later becomes the backbone for my design proposal.

Extra Input

Some extra inspiration need equal attribution in this documentation for their influences on my design approach and aesthetic choices. Conclusively, my later designs should inherit some visual trait, both from previous example and this part, notably with the desire to use metal rods/tubing to construct minimalistic shapes that are efficient in achieving desired structural integrity with considerable less volume.



As a representative work example of the new objectivity movement, German photographer couple Bernd and Hilla Becher documented series of industrial structure in large format photography. Their work focused on capturing the beauty and essence of various industrial structures such as water towers, gas tanks, and cooling towers¹¹. Their meticulous approach transformed these functional forms into objects of serious appreciation, inviting viewers to reflect on the relationship between function and aesthetics in the industrial landscape. The Bechers' work was a valuable discovery as visual records for sketching shapes with both industrial characters and elegance.

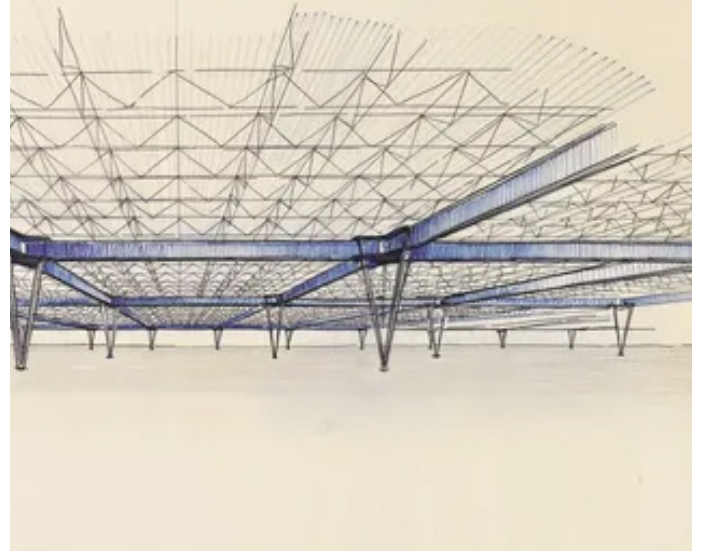
The bottom-right picture was in respect to Becher's approach, done by me in similar approach, capturing a pre-demolishing industrial water tower on color film.





American designer Ken Isaacs formulated a long term project known as the Living Structure in the 60s¹². His vision was to create modular, adaptable living spaces that reflected the principles of self-sufficiency. The Living Structure was designed to be flexible, enabling occupants to configure and reconfigure the space to suit their changing needs¹³. The designs featured in the publication, ranging from furniture to completely integrated shelters, utilized standardized components that could be easily assembled and disassembled for affordability and accessibility. The documentation of this project offered an interesting option of constructing my later designs, though it isn't actually realized in the end product.



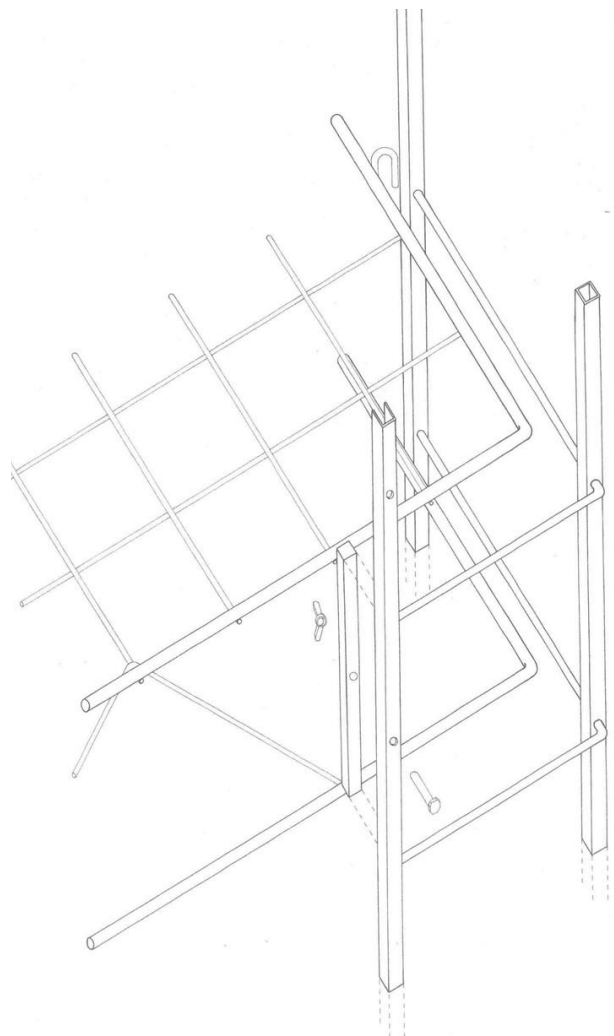


French Architect Jean Prouvé designed and manufactured a range of truss structures, His truss systems incorporated standardized elements that could be easily assembled and disassembled, making them adaptable and portable. These systems were not limited to a single application but could be used in various architectural contexts.





Abitacolo is a lightweight bed structure for children designed by Italian designer Bruno Munari¹⁴. Children are free to customize the modules on different parts of the bed to achieve different functions. This design coincided with some early sketches of my design proposal, and by further looking into Abitacolo's design, I tried to take some reference in the construction of a metal structure



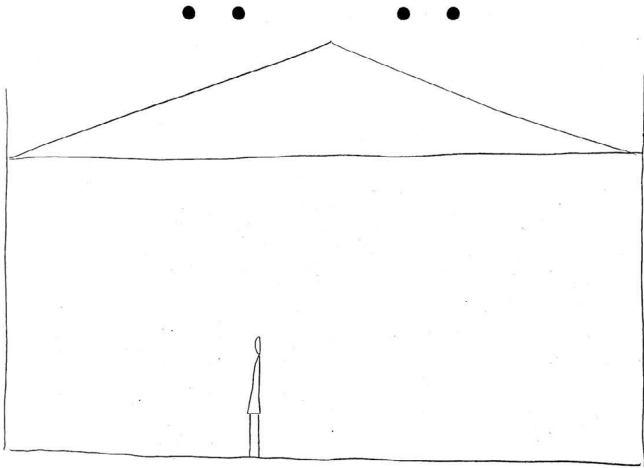
Project Proposal: Living Forms

Based on the previous discussions, I have proposed a comprehensive vision for the project, titled “Living Forms”:

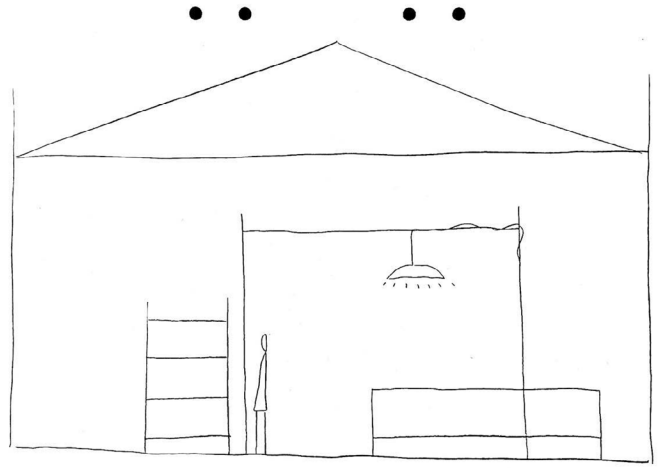
The project aims to present a diverse collection of domestic furniture that promotes and supports the contemporary living experience, characterized by flexibility in the context. The furniture should enable easy and pleasurable storage and organization of physical articles, provide means for self-sustenance through various activities, and allow for effortless switching and rearranging according to different occasions. The ultimate goal is to transform traditional domestic spaces into vibrant and dynamic environments. The term “living” signifies not only that the furniture pieces are designed for domestic settings but also emphasizes their adaptability and responsiveness.

The illustration on the right side of the page showcases my ideation process in simple steps. It starts with a “reset” of a domestic interior, devoid of any objects, and then introduces potential shapes that serve as shelves, hangers, or tables. Notably, all these designs incorporate moving compartments to indicate their ease of movement and adaptability.

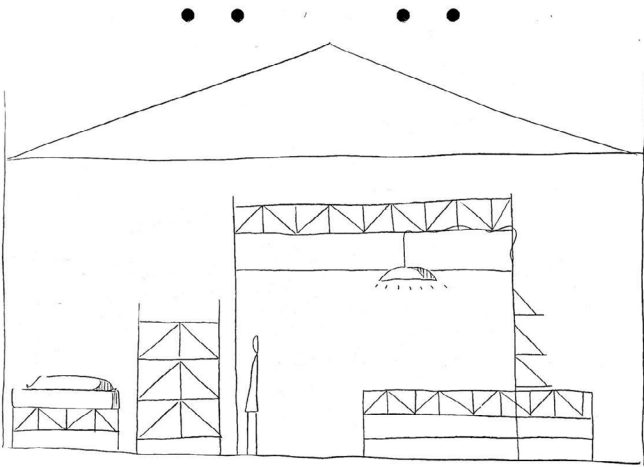
Among the objects depicted on the page, two items have particularly captivated my attention and stimulated deep thought. The first one is a large overhead hanger supported by slender columns, reminiscent of Murani’s earlier rendition of the bed. This design offers an intriguing possibility for elevated storage. The second item is a substantial utility table that can accommodate various tasks such as cooking, eating, entertainment, and working. It is designed to be easily cleaned and rearranged, providing a versatile platform for diverse activities.



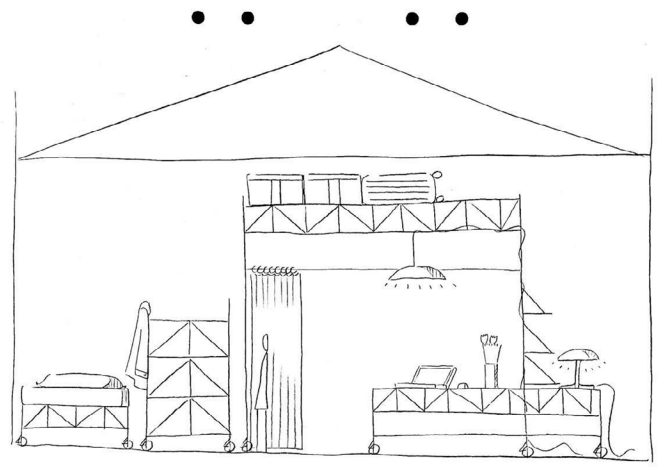
1



2



3



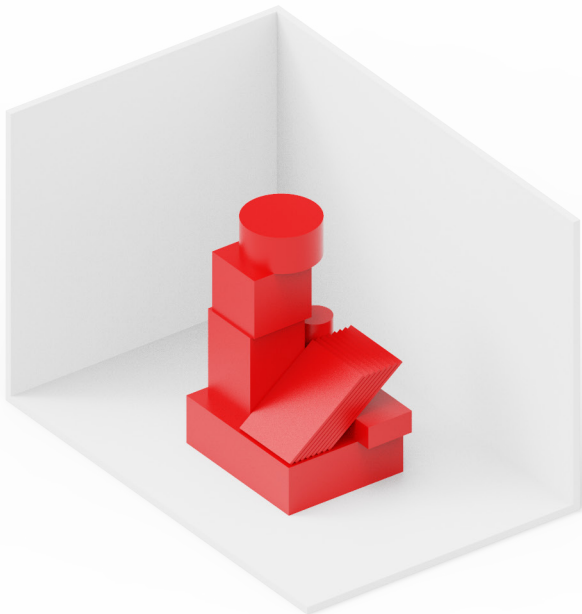
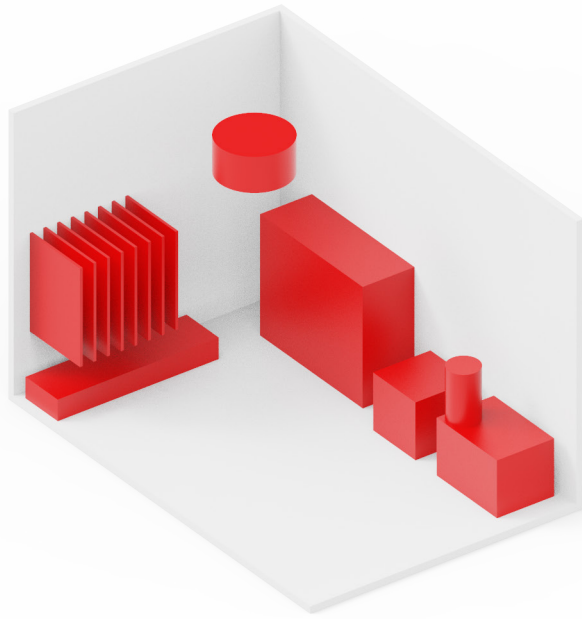
4

Rearranging Storage

The storage aspect of the proposal warrants a separate discussion to explore how exactly the rearrangement of storage should be manifested. Unlike traditional domestic spaces, where storage is typically organized along the edges of a room to allow for easy traversal and airflow in the central area, my proposed concept involves creating a dynamic state for storage units. This concept breaks away from the fixed placement on walls and ceilings and instead introduces a movable island in the middle of the room. It serves as a comprehensive complex that can be repositioned according to different needs and activities. To better visualize this idea, one can imagine a Christmas tree that acts as a focal point for presents and hanging trinkets, and then envision the tree itself being mobile. In a similar manner, the storage island becomes a central point of concentration for various items, allowing for fluid reconfiguration and adaptability.

By liberating storage from its conventional constraints, this concept of mobile storage introduces a new level of flexibility and functionality within domestic spaces. It encourages a dynamic and evolving environment, where storage can be effortlessly relocated to accommodate changing needs and preferences.





Hanging



Disposed metal grids repurposed as meat hanger for dry aging. Captured in Changsha, China, 2021

Another important concept to consider is the incorporation of hanging functions within the storage units. Throughout human history, hanging storage has been a common practice across various cultures and civilizations. It can be observed in spaces such as kitchens, stores, wardrobes, and workshops. Hanging storage provides an efficient solution for storing or processing items that may not be suitable for placement on horizontal platforms or shelves.

Interestingly, traditional hangers are less prevalent in modern housing, where their implementation seems to be limited (clothing and curtains). However, from the project's initial whimsical perspective, which aims to imbue everything with movement, integrating a

moving hanger unit can offer a fresh perspective on storage.

By incorporating moving hangers into the design, a new dimension is added to the storage capabilities of the furniture. This allows for versatile storage solutions beyond conventional shelves and platforms, providing an innovative and adaptable approach to organizing and displaying various objects. The integration of hanging functions in the storage units opens up possibilities for unique configurations and arrangements, facilitating efficient and visually appealing storage throughout the living space.



NEST WE GROW, 2014, College of environmental design UC Berkeley and Kengo Kuma associates.



Action Office I, 1964, Vitra Design Museum Archive

Ideation Approach: User Case or No?

For the proposal of this project, the ideation process potentially has two major approaches: One that emphasizes on defining specific user cases, and then designing acute solutions based on gathered statistics. The other one leans toward keeping the form and space rather undefined and leaving the interpretation to the audience.

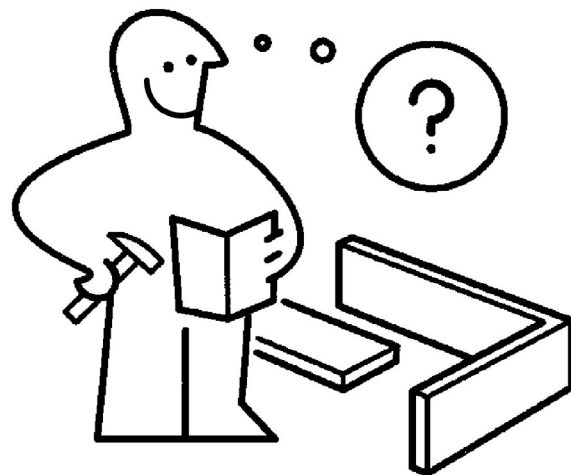
From the perspective of your project proposal, which seeks to revolutionize stagnant residential spaces, a comparison can be drawn with Herman Miller's office design projects during the mid-20th century, known as "Action Office." Led by Robert Propst and in collaboration with George Nelson, the project conducted extensive research on human behavior, neuroscience, health, and the environment. Propst argued that the highly structured traditional office environments of that time stifled creativity and had detrimental effects on workers' mental and physical health. He argues that Designers should alleviate the situation by re-creating the office space through scientific studies. The project proposed the first open-plan office design with a collection of office furniture and accessories. Working platforms are featured with adjustable heights between sitting and standing postures which in prediction will increase worker's level of concentration. And a sliding shield on the desk allows preserving unfinished works and helps the worker coming back to the task in the morning. Acoustic panels are also implemented for preserving privacy and reducing noise level¹⁶. The design made its major achievement in design communities and was awarded. On the consumer market, however, the design was poorly received for its extravaganza at its time. the market feedback was only to be saved by

the Action Office 2, which according to many people, ironically gave birth to the lifeless cubicle offices in the late 20th century¹⁷.

Conclusively, for my degree project, I believe that the second approach of ideation could possibly lead to a prospective outcome in design. Besides the story of Action Office, many other design endeavors reveals that designing by strategically setting a goal hardly ever lands on exactly where the designer initially intended, and it would be called beneficial if the solution does not at a certain time turns into a problem. The other reason is my perception of domestics and offices as spaces with different attributes, that in a domestic space, individuals have decisively more control on the space and objects, and the efficiency of activities at home does not necessarily need to be evaluated.

I imagine that the design results for my project should ideally be a collection of furniture with a considerable level of vagueness.





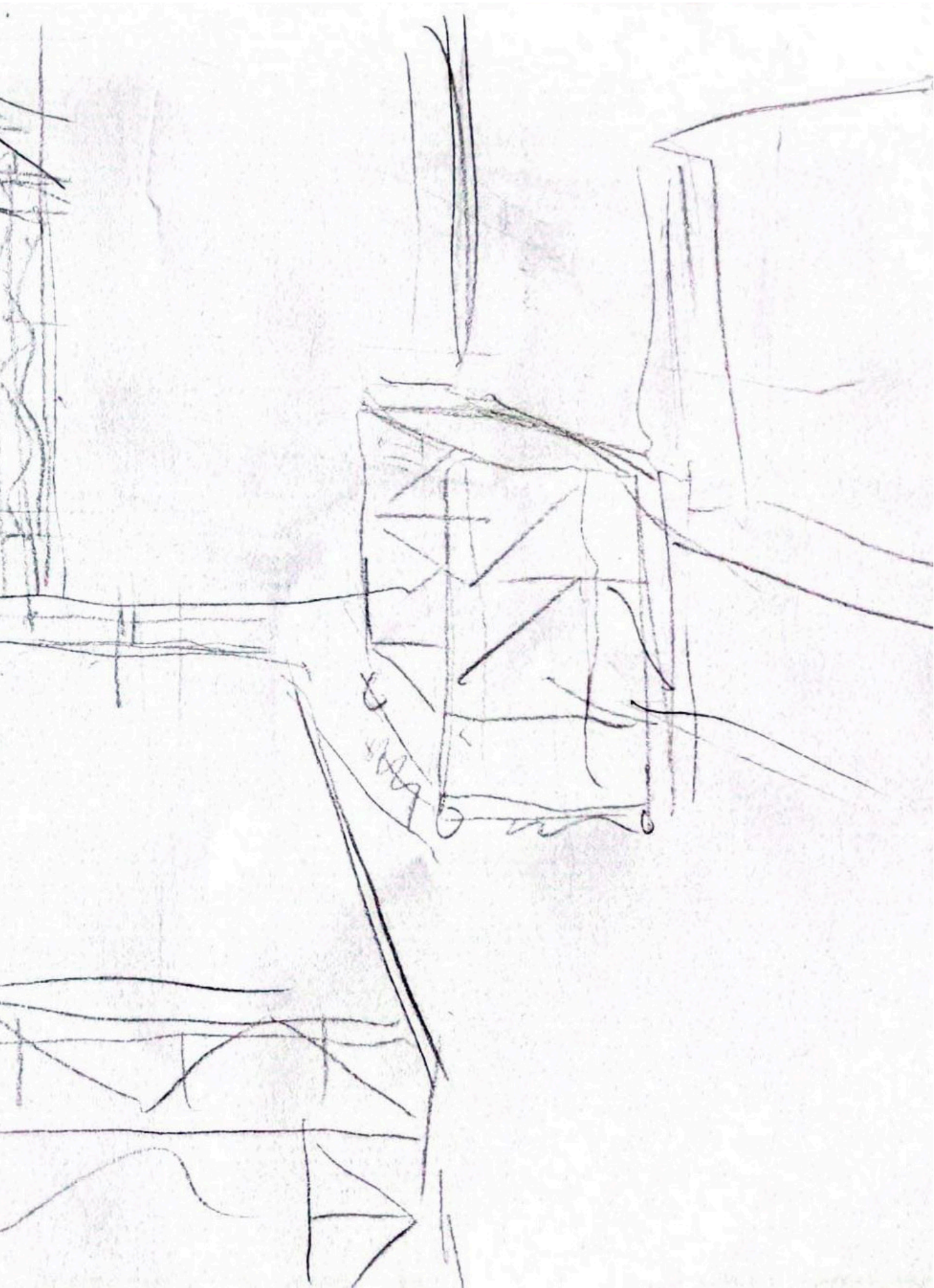
It is OK to have doubts



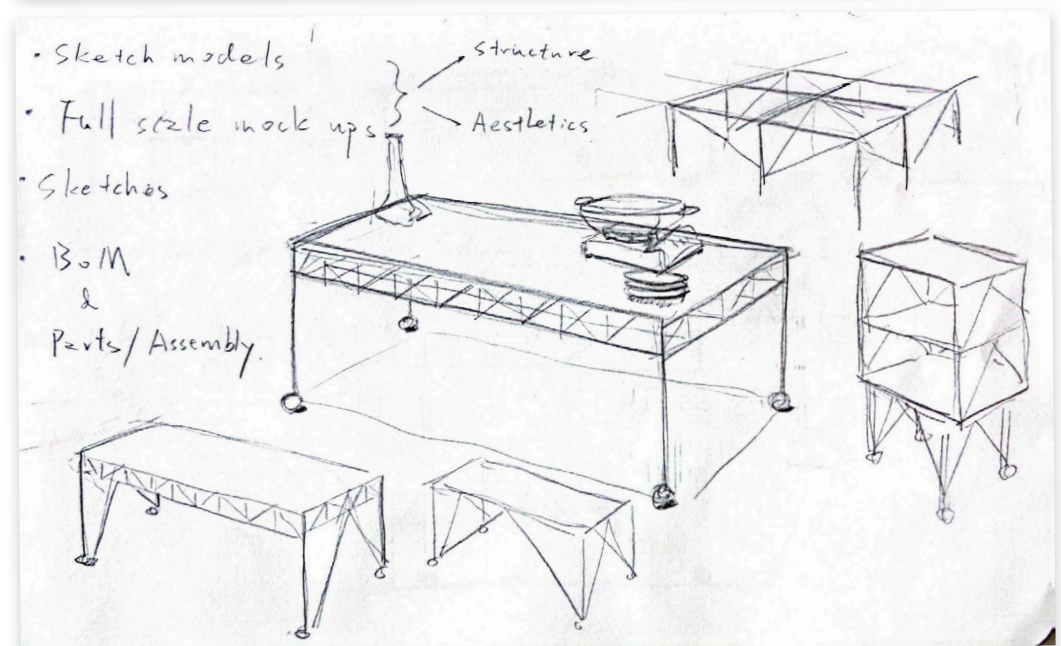
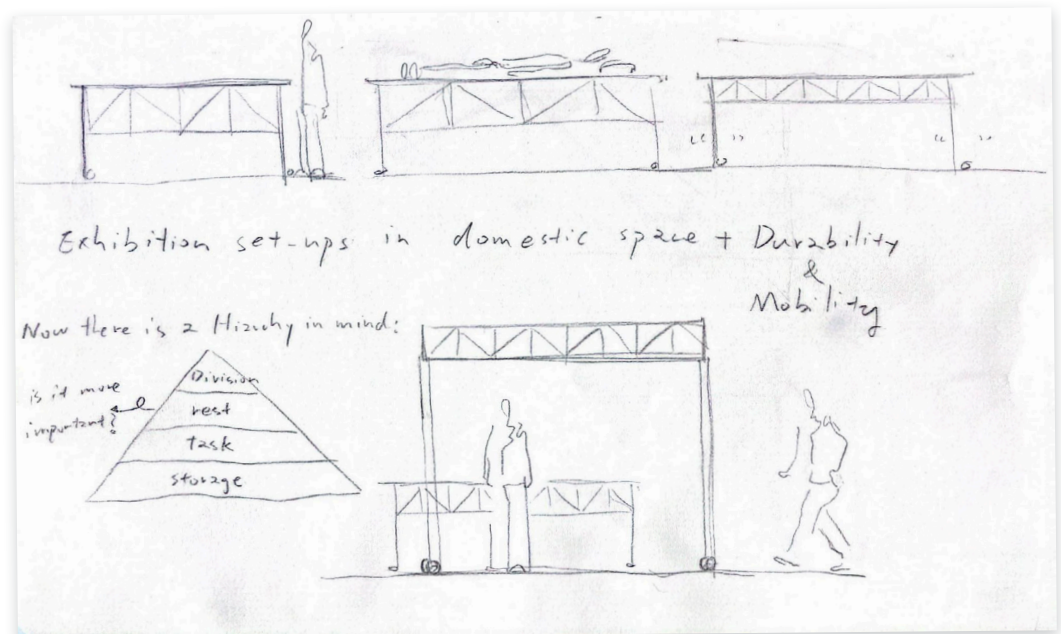
Sketch Group 1

Following pages showcases the earlier part of sketches before I further decide which piece of furniture to focus on specifically which calls for more detailed design configuration and making the prototype.

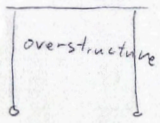
At this stage, however, less guided visual exploration can be found on various items including both the overhead structure, the table and cabinets. Each of them carries possibility to be further elaborated.



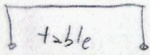
The style of furniture pieces at this point has become more specific than the form and structure designs. Overall they are all visually indicating structural support with thin metal structures made of rods or tubings. And the triangulation in the forms serves both engineering purposes and aesthetics ones. Noted that even the giant overhead truss is only supported by four thin poles. The idea is to keep spatial interference at a minimum for people moving indoors and accessing the design. Some iterations feature flexible dividers/curtains so that the design can occasionally function as dividers too. This kind of design later brings up challenges with questionable weight division and structural strength.



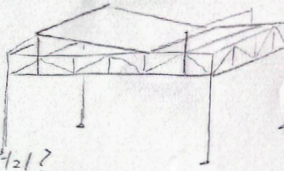
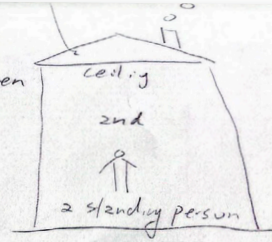
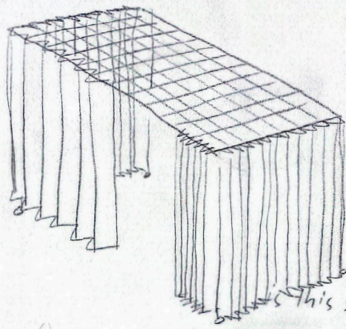
- Maybe i'm just trying to find a place to hang my duck
 - Narrowing down the spectacle: how to use space between



+



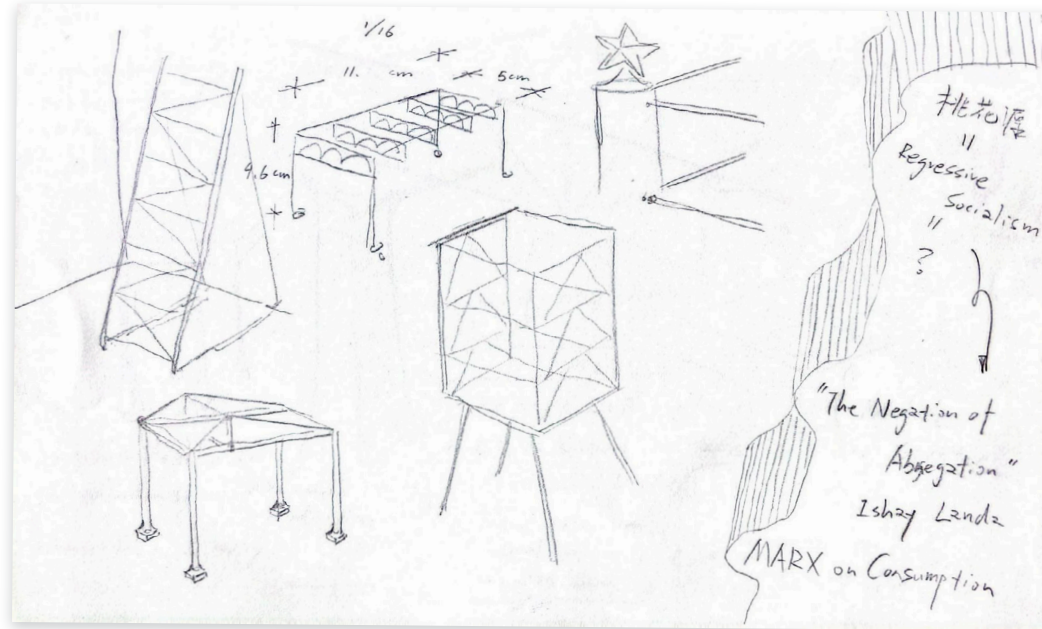
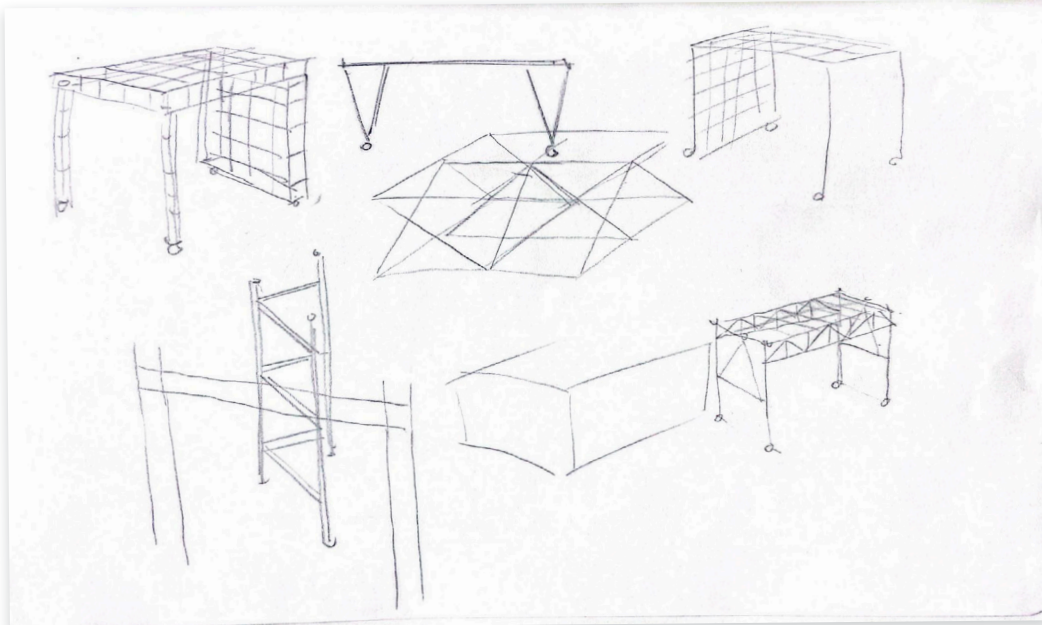
+



this 2 hospital?



• After goin after her for all these years.
 I'm sad to reassess the fact that I'm
 just afraid of loneliness :c



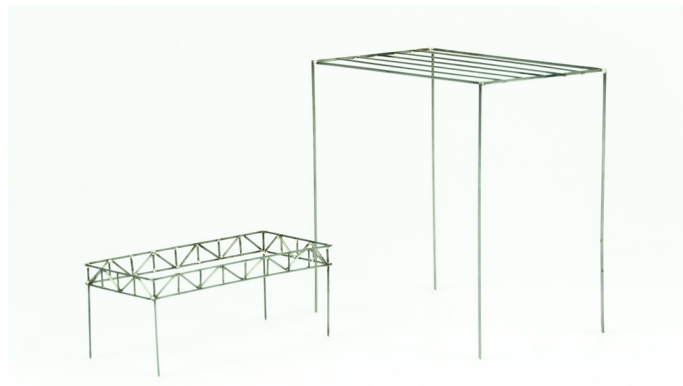
北花源
 ||
 Regressive
 Socialism
 ||
 ?
 "The Negation of
 Abnegation"
 Ishay Landa
 MARX on Consumption

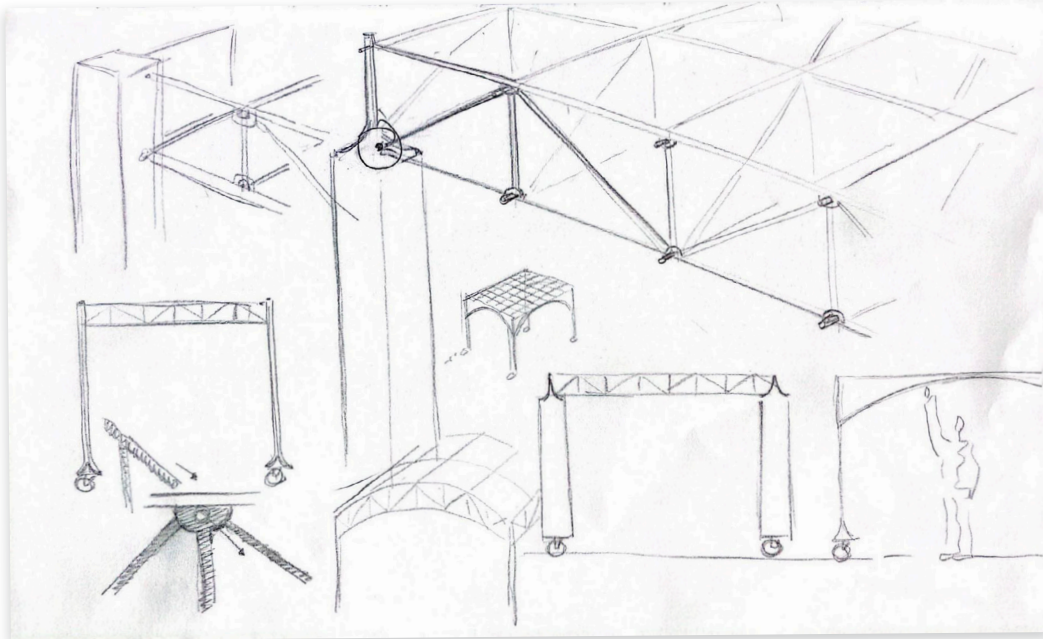
Challenge

The design for hanger becomes the most challenging for its needed structural integrity in relation to the scale. There are countless of precedent designs of temporary truss structures that offered interesting solutions, and on the right page shows some of my thoughts of how to elevate the metal framework to over-head height.

But the major problem in finalizing a specific design is the integration of moving capability, making the supporting columns unable to be fixed on the floor. Such requirement makes the structure extremely difficult to define without making major compromises, for example adding horizontal reinforcement at lower levels, which undermines the argument for mobility. The hanger will no longer be a easily accessed unit and becomes a major obstacle in a domestic space.

The making of scale model with metal wires further proves the problem.





• Design of furnitures.
 • can be moved w/ person
 • costs less than interior etc
 (Adjustable)

• 6 table
 • A "hub"
 • storage (shelf, Box, cabinet)

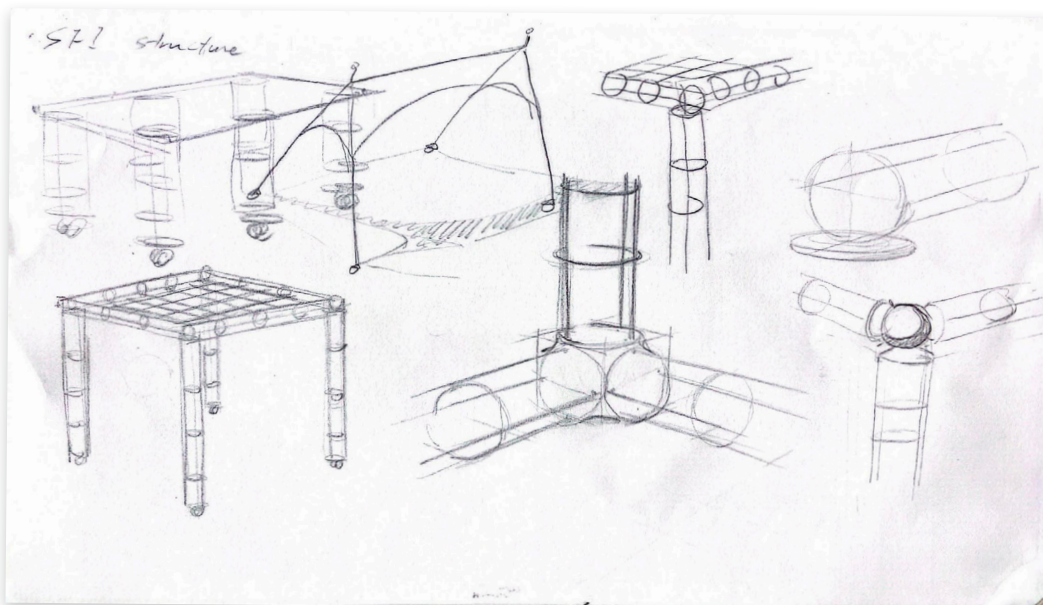
Backing Logics:
 Debate of how should we live?

a. functions dissolved by city (Ito Toyo-Poo)
 b. City to support "spectacle" (Koolhaas - DNY)
 c. New-urbanism
 • Local community
 • rooted living

Mobile "Spectacle"

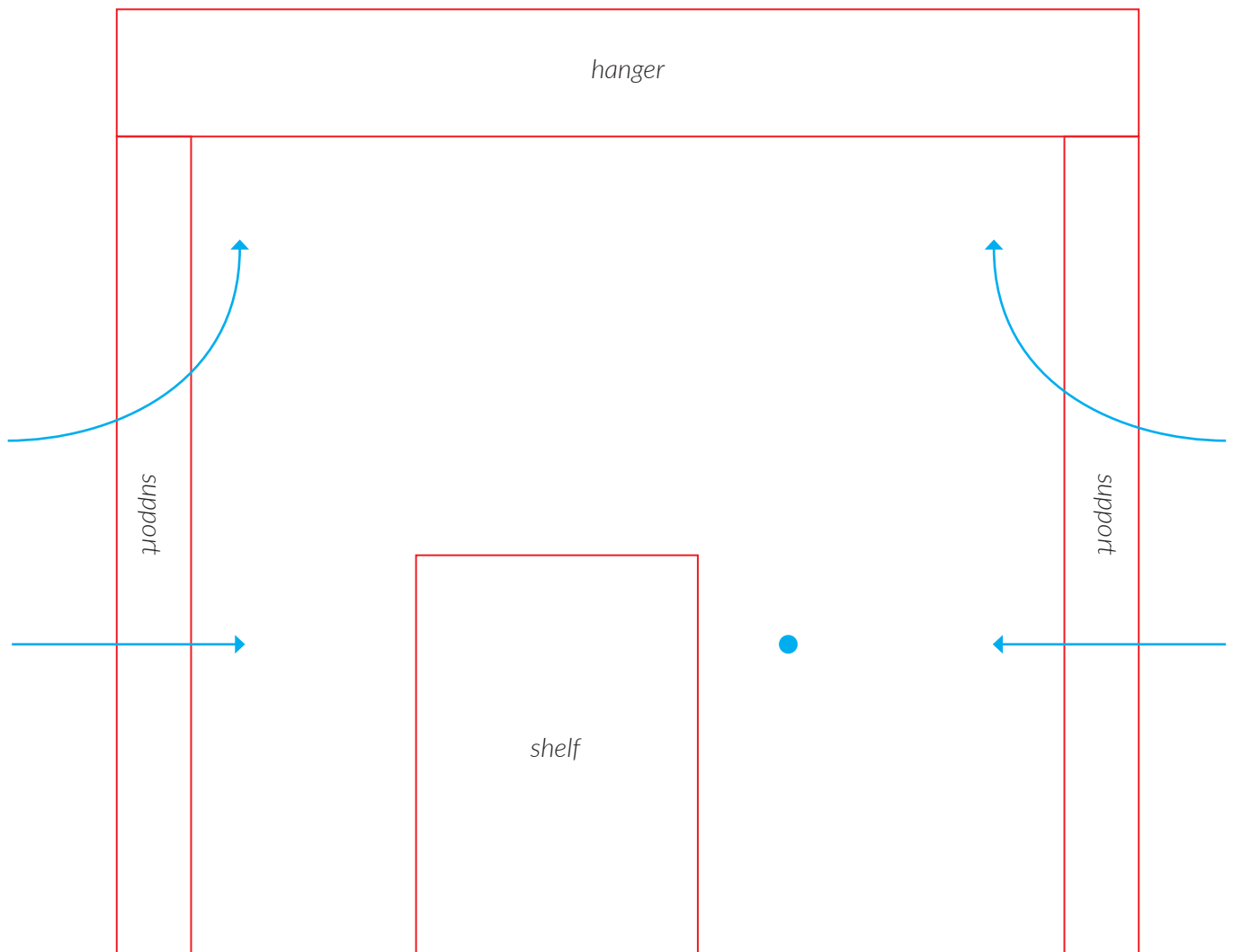
• mobile, flexible liv. & resource
 • independent of → production
 • comfortable & happy.

regressive socialism fits

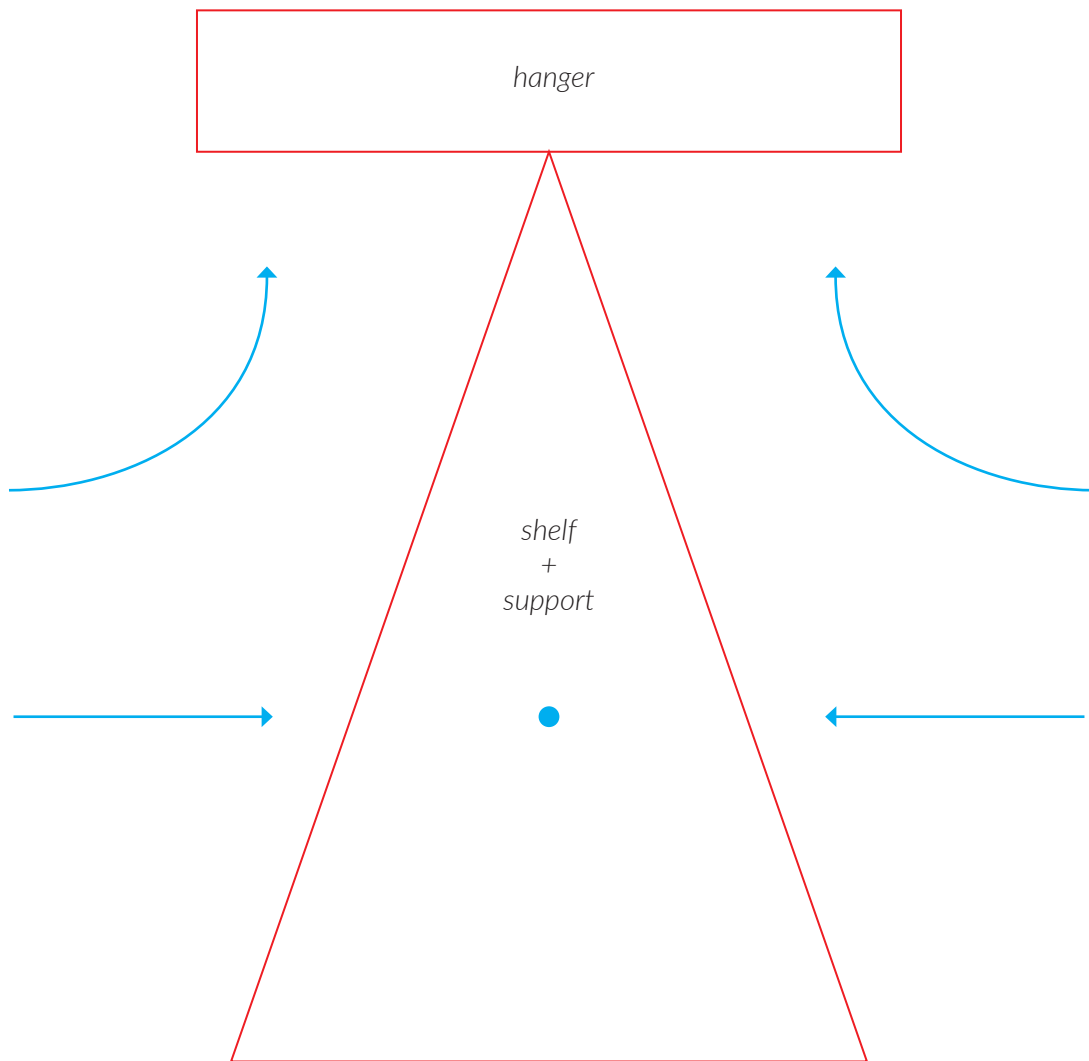


Adaptation

Changes and adaptations are needed for at this point I am stuck with the structural dilemma because of my insistence on shape and form, I started looking out for other possibilities that create a better balance between the delivery of the concept and construction. The reason I decided, to look for a solution besides adding lower-level reinforcements, is to keep all sides open under the truss roof. Not only should people walk into it from all directions, the piece itself, benefits from this openness that it can even be moved right over a lower object (table/ cabinet) so that the space has the option to be more compact.



And after totally abandoning the previous form I had in prediction, I found possible balance by trying to merge the shelving unit and the hanger, and make the lower structure serving both the structural support for the top and the stand-alone shelving. The triangle profile of the shelf should also open up space for hanging. The idea switch is indeed a major compromise, specifically at the scale of the hanger unit, yet the core idea is still captured: moving storage and overhead hanging can both be achieved.

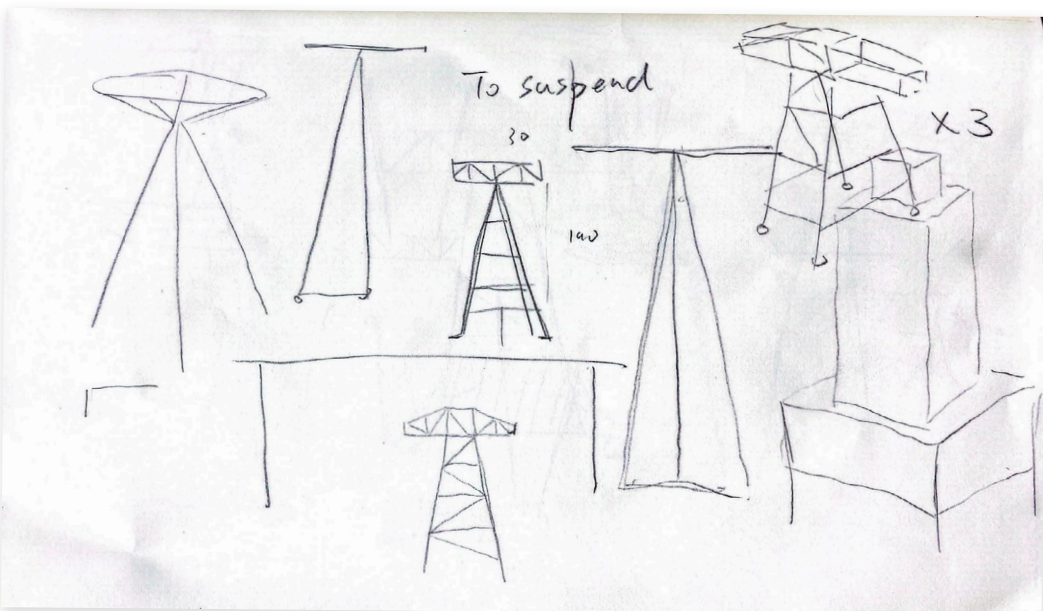
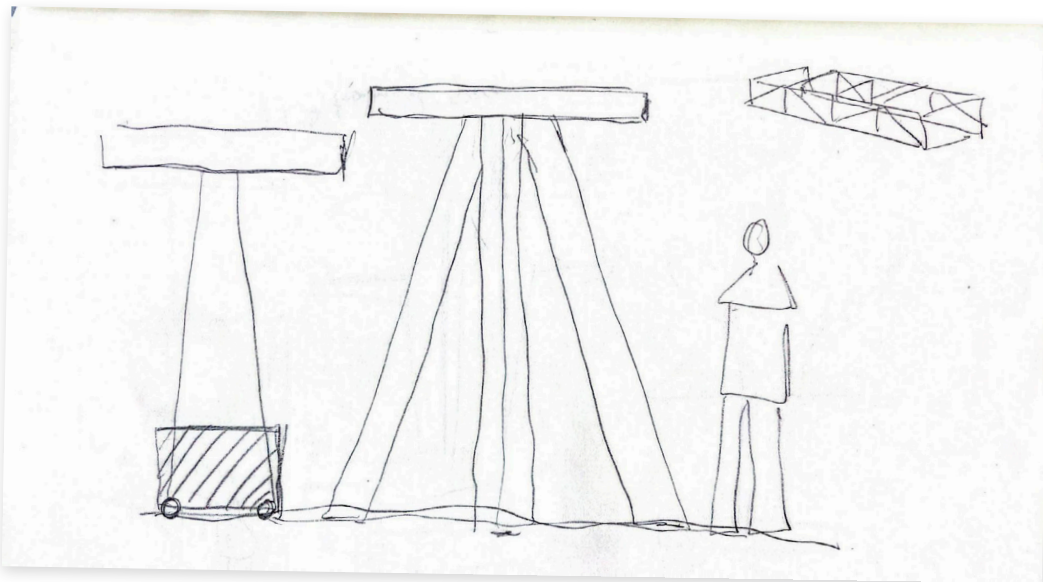
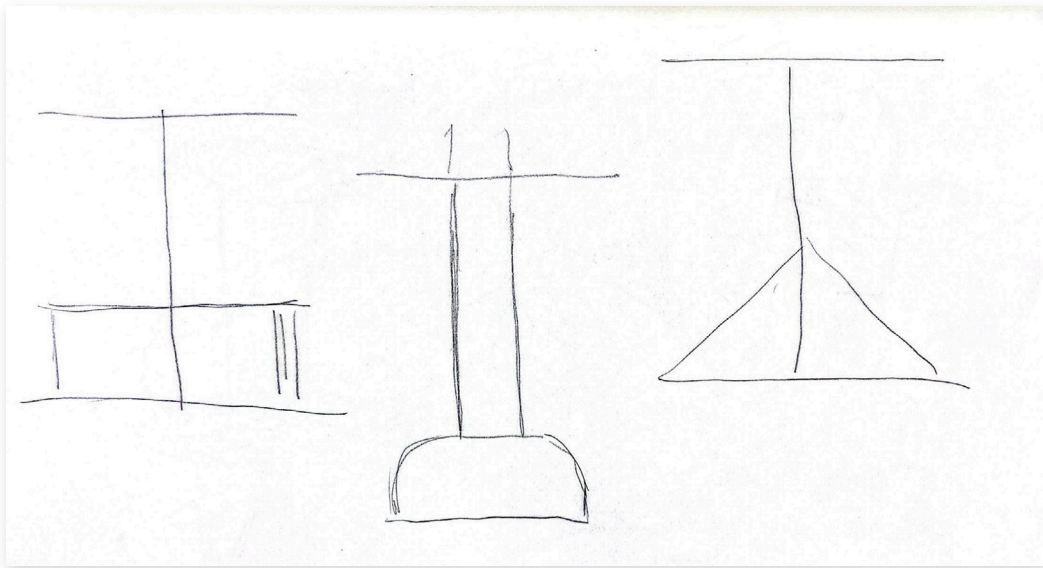


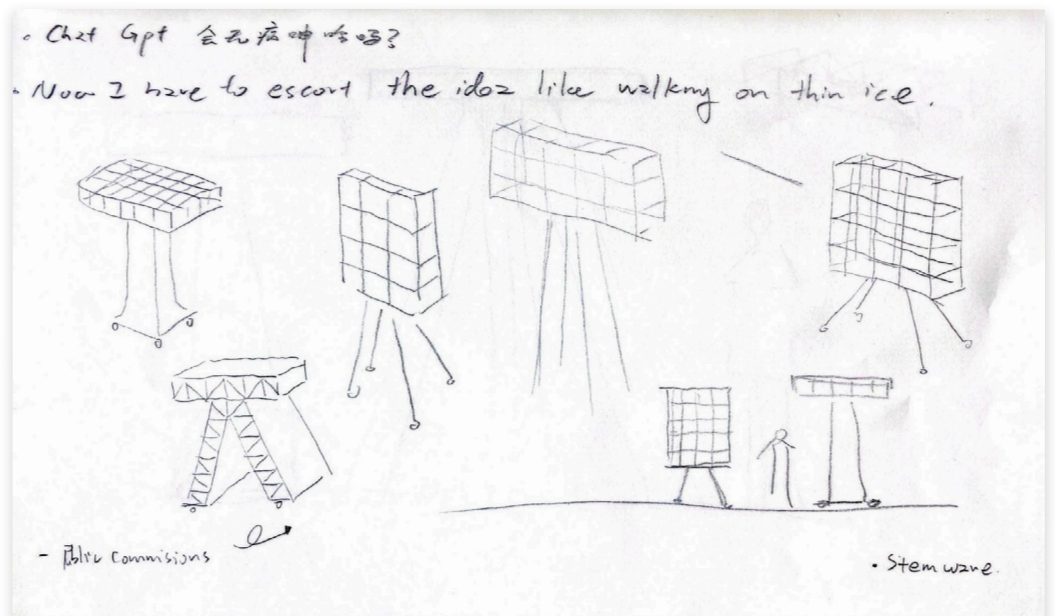
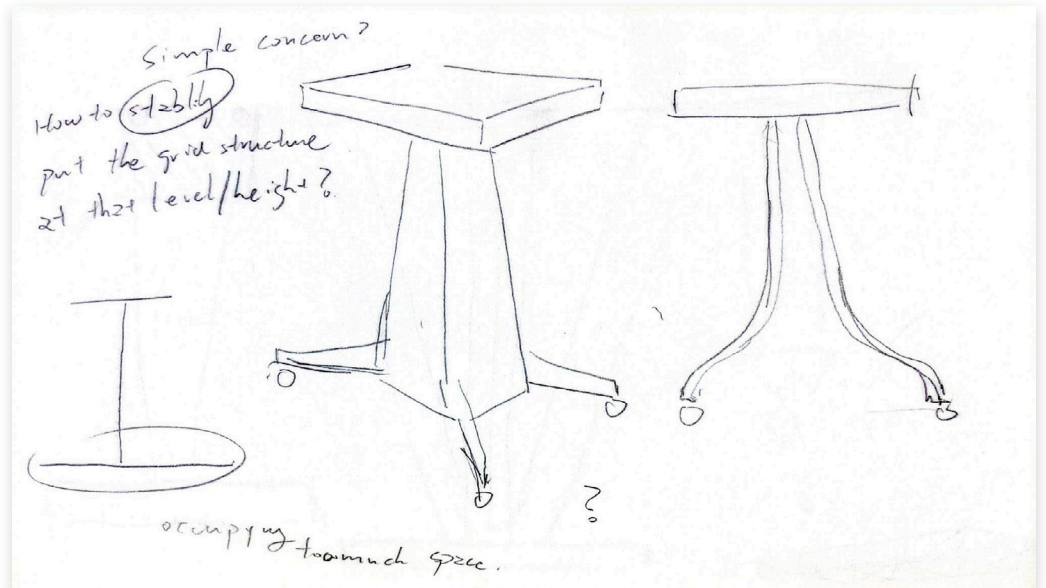
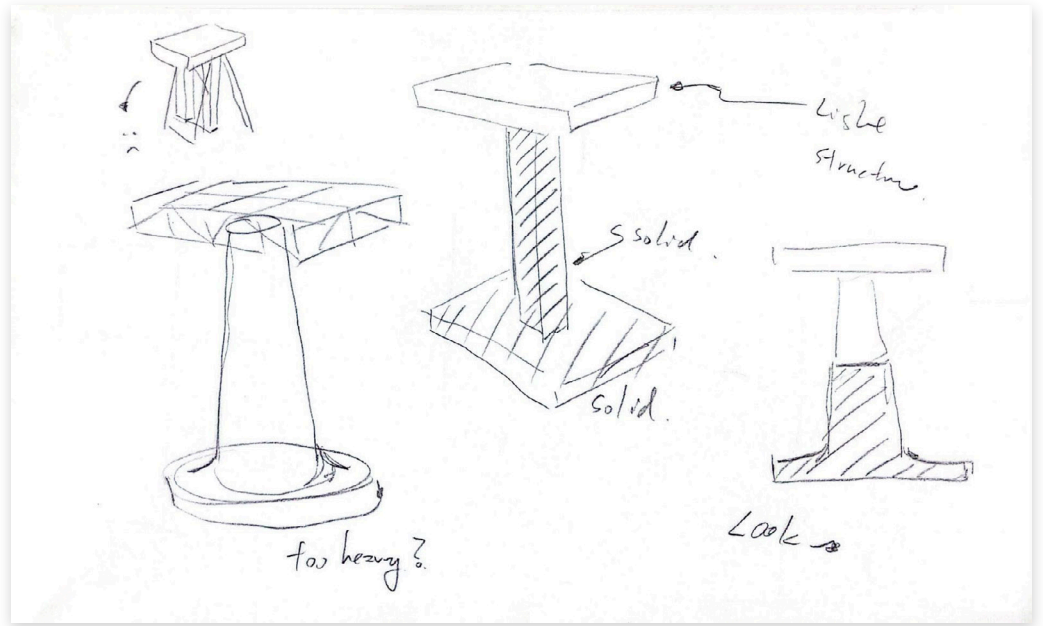
Sketch Group 2

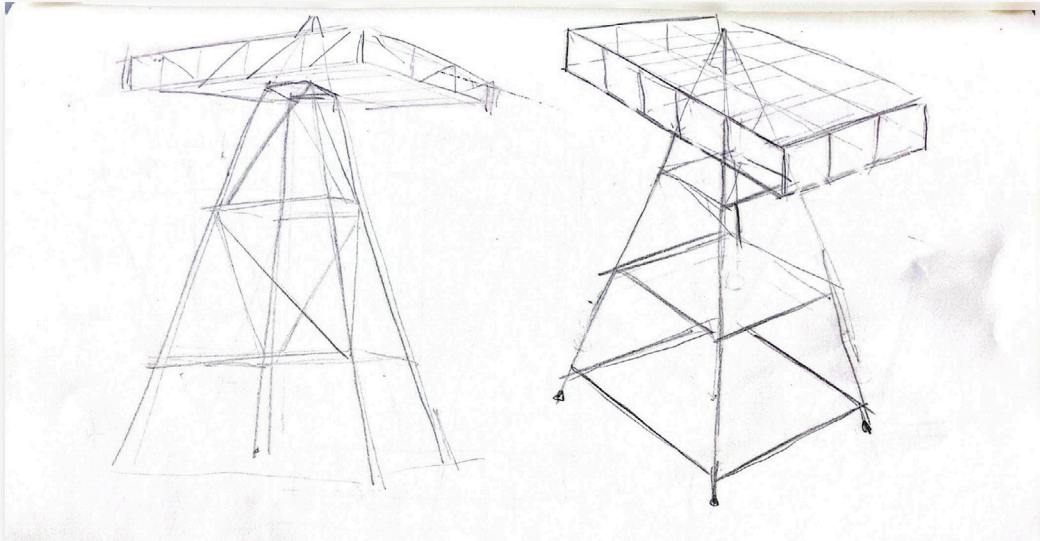
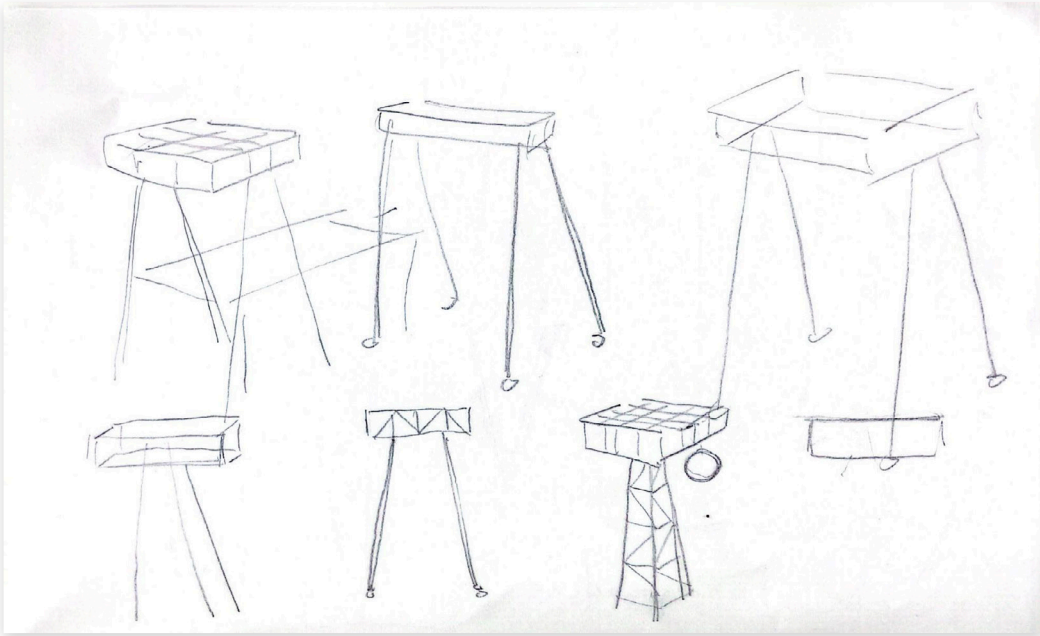
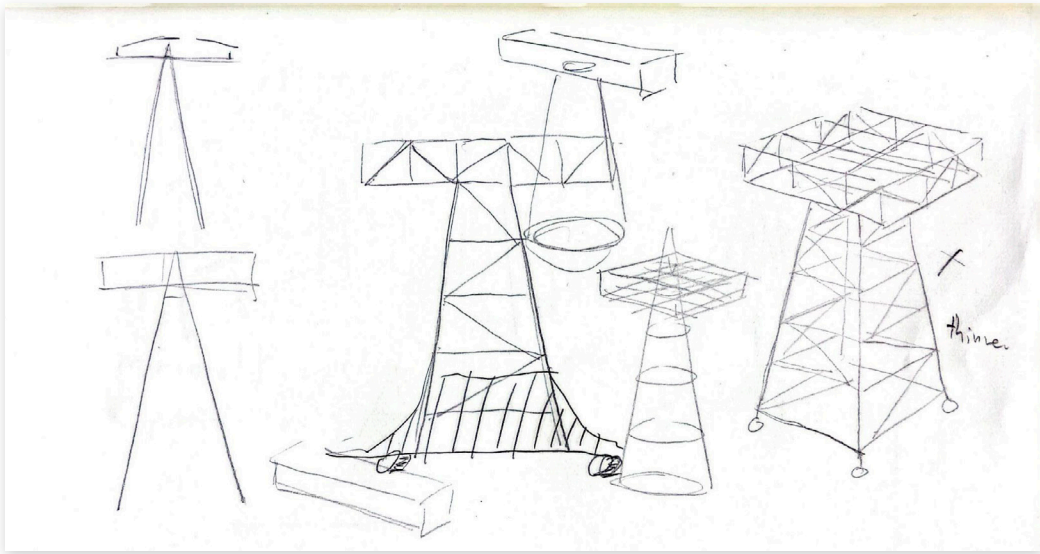
The change helps me concentrating the visual exploration on one object instead of several, as now the shelving function has been merged with the hanger structure. This part shows the later group of my sketches, where I started with simple line drawings and developed various iterations.

The form and shape also echoed with constructions of lattice tower. Their concise shape and function make them, to my view, a precious gem of human engineering. At this period I intensively take focus on the tower structures I encounter in daily-life, both physically and digitally. It would be very interesting if such symbol could be translated in domestic contexts.





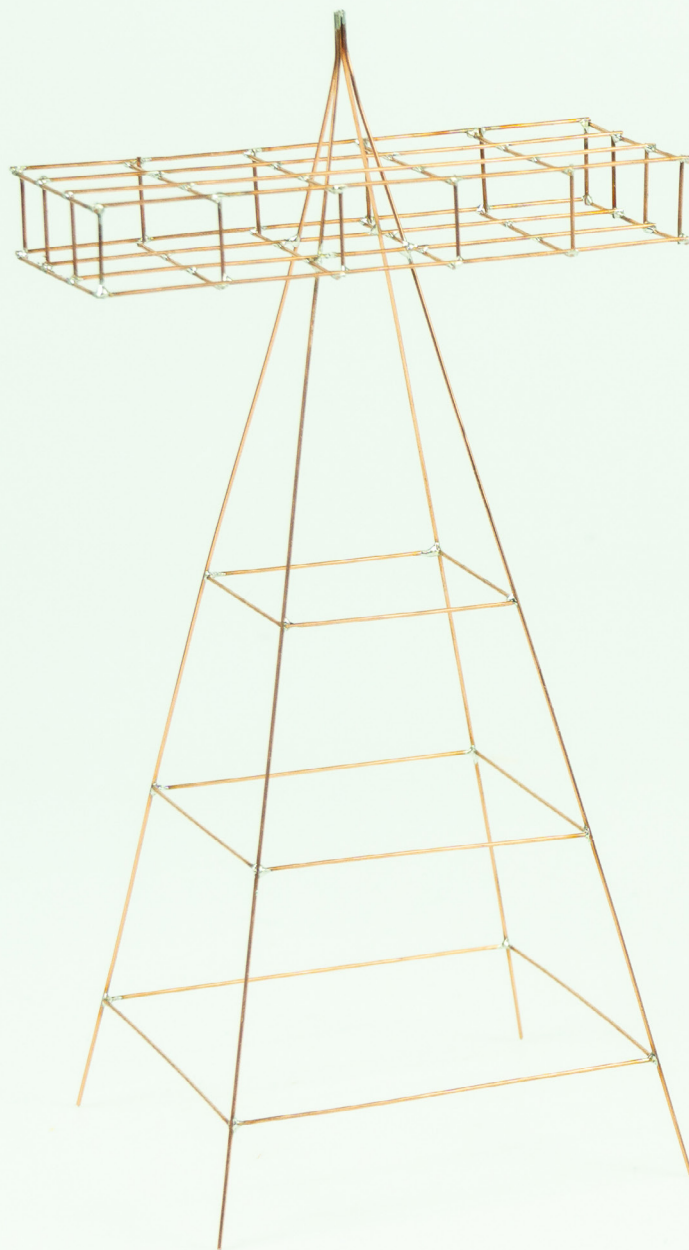








Transmission Towers in São Paulo, screenshot from the movie scene, 2021, Alexandre Moratto, 7 Prisoners.

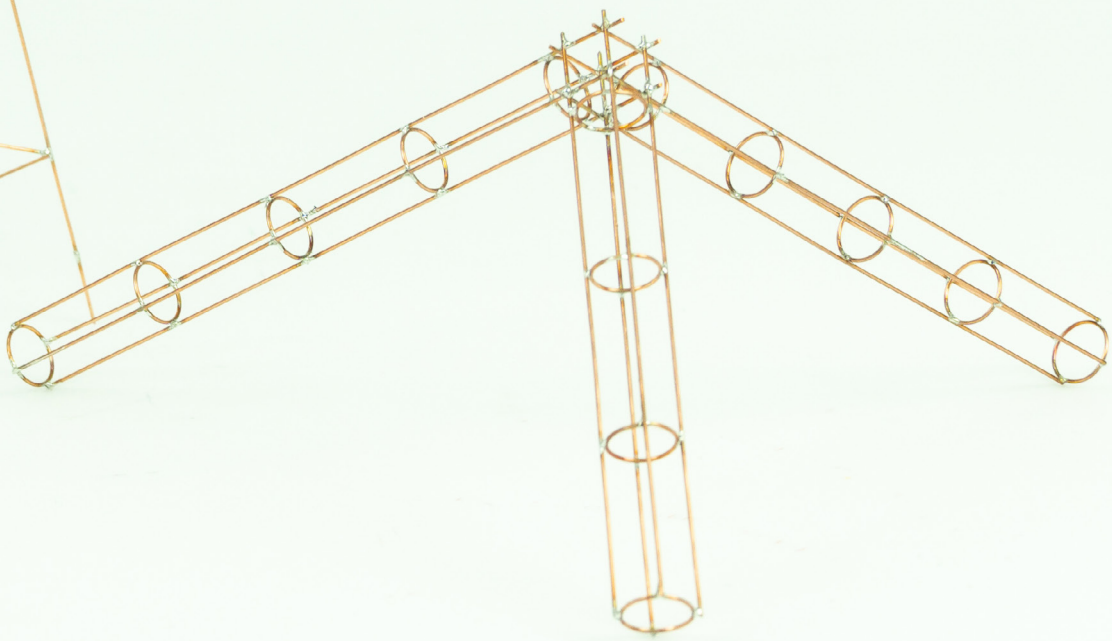




The development of scale models now places a greater emphasis on accuracy in proportion and scale.

Once the 2D sketching process reaches a point of satisfaction, the creation of the models becomes easier as previous challenges with weak structures are overcome. These sketch models contain valuable information that directly informs the later prototyping process. While making them, I paid extra attention to proportion, shape, and a relatively more accurate scale (1:10), as well as potential design connections.

This stage represents approximately 70% completion in the design process, with the remaining effort focused on material selection, part assembly, detailing, and finishing. These considerations are crucial for ensuring the final design is perceived as a manufactured industrial product, rather than simply a functional sculpture.

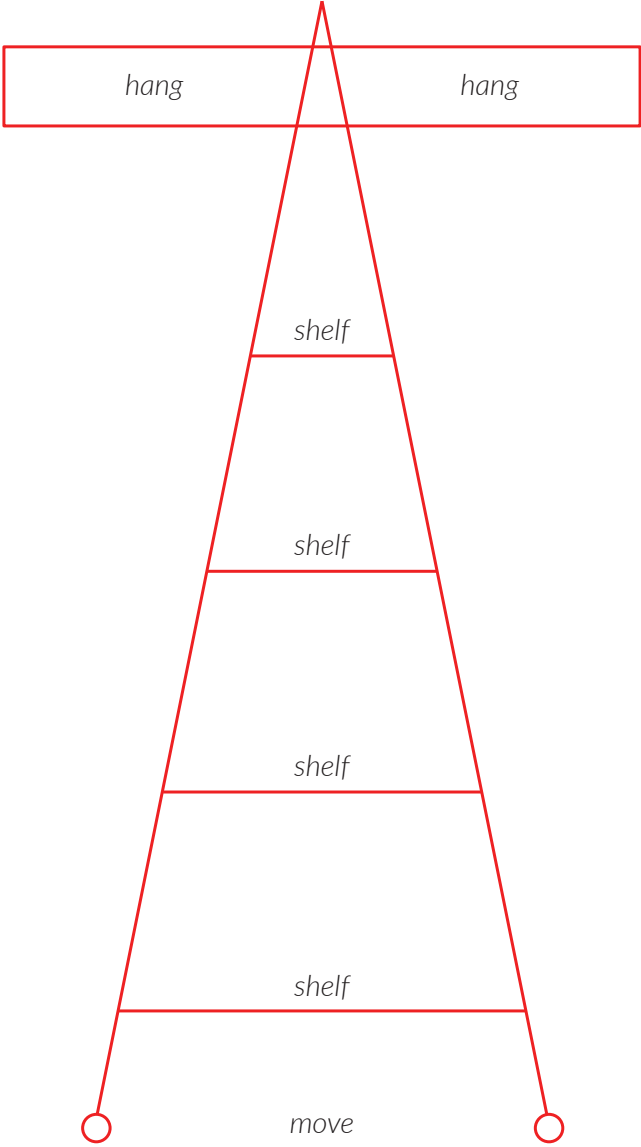


Living Form #1: Shelf and Hanger

The final decision for the project is to design and prototype a moving storage units derived from previous visual exploration. Illustrated on the right, the storage offers horizontal shelving spaces at four ascending levels, an over-head hanger to be supported by the shelves, and caster wheels at the bottom to allow free positioning at home. This unit, later presented as a fully functional prototype should be the first defined object in my Living Forms proposal.

The name of this unit, derived from the title of the project, is Living Form #1.

And just as explained in the concept proposal part, this design will serve as a moving island for storage, that in turn activates the traditional storage alignment along the wall space. The articles it carries are varied based on intended purpose and context and can be efficiently changed by relocating to different places in a domestic situation thanks to its moving capability. For working at home, the unit provides ample space for sorting work materials and devices either through horizontal placement or high-position hanging. Adjustable light sources can also be attached to provide good illumination around the working environment. For kitchening, the units offer various ways to store foods and tools. Many foods prefer even airflow for storing or for processing, making hanging the ideal way to handle them for the best result. The hanger space provides an easily accessible approach to that. The design can also be used to store books, home appliances, clothes, the list can go on... Early part of this documentation has argued for maintaining the user case faintly defined. And the design, corresponding with its title, aims at offering a form, instead of a device, for expanding possible interpretations and uses.



Workflow

*scale and
proportion*

*full size
mockup*

*revising design
based on mockup*

*finalize
design*

and

Goal



*material preparation and
part sourcing*

*fully-functional
prototype*

*revise design
based on prototype*

*prototype for
production plan*

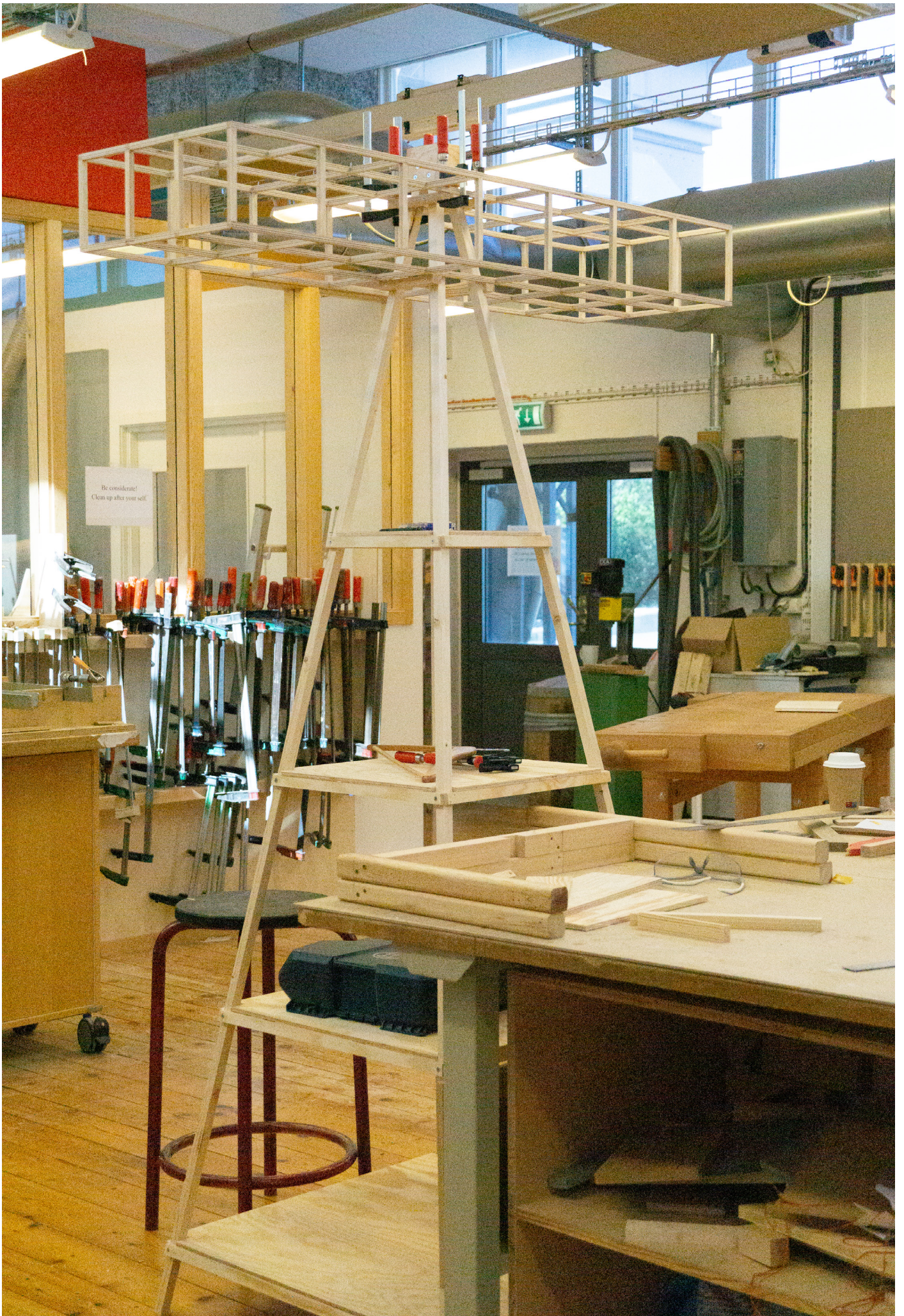


With proper consideration of available time and budget available this semester, I set the goal of my degree project at successfully developing a fully-functional prototype, which means the correct material is used, and intended functions are achieved (shelving, hanging, moving). In order to reach this goal I planned a step-by-step working plan to make sure there I can move steadily toward the goal.

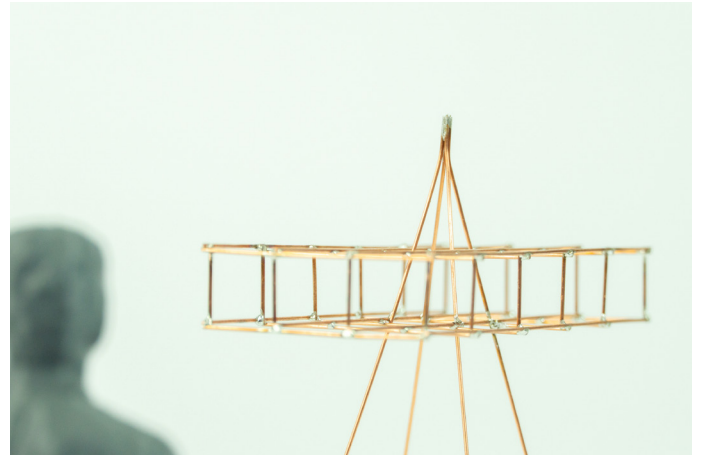
Based on what have been decided in design, which is a big narrative of mobile furniture, and a basic idea of form/shape, I need to start with deciding the size and proportion of the furniture and then verified its viability through a full-scale study. After these I will move towards the construction plan, meaning what parts are used and types of connection and joining, should be designed. The next step is to decide the material and shape of each of these parts, along

with a final plan for fabrication. After all parts are gathered/sourced, ideally from the stock of the school's workshop, The final fabrication process will deliver me to the goal.

As the project proposal presented a larger context than only designing one piece of furniture, I assume that the project will be carried forward in the future tense, meaning that further revising will take place so my prototype starts to consider more realistic aspects of design such as production, packaging, assembly experience and logistics, etc., And more furniture designs can be developed under the same narrative, namely the table for activities, smaller storage units and other furniture pieces depending on the expansion of the concept.



Mockup



After deciding on the general proportion of forms for this design, the structure needs to be verified at 100% scale before prototyping with the final material. There are at this point different ways to construct the full-size mockup, and the work offers a series of different materials ranging from corrugated cardboard, PVC tubes to wood. For this specific mockup, I choose wood, both lumber and plywood sheets, to construct the full structure, for the material's relative rigidity when cut into slats. If the structure made of wood will support itself and achieve some capability to withstand storing weight, the form design is a success and can be translated into the final material, which is steel.

The mockup serves another specific purpose, which is the finalizing of the height of the top hanger. In the wire model stage figures can be placed beside models

representing the same scale, and fundamental ergonomic studies can reach to conclusion through simple measuring of for example how to reach the hanger's height with hands, or how high a certain shelf level should be for comfort in the interaction with it. However, the scale models will not conceive the visual experience of the whole design, especially in massive size. In this respect, the designer can either choose to develop immersive CAD renderings or construct full-size structures, depending on the investment of time and effort.

The mockup, in this case, helped me place the hanger structure at a comfortable height at 2m, both in function and visual experience. Other critical measurements, i.e. width of hanger, shelves height and leaning angles of the shelf part, have also been verified in the mockup process.



A photograph of a person walking on a paved patio area. The person is wearing a blue t-shirt, a blue cap, and dark pants. They are walking from left to right. In the background, there is a building with a window and some greenery. The ground is paved with dark grey tiles.

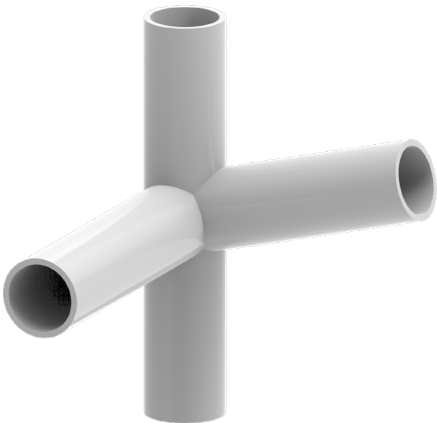
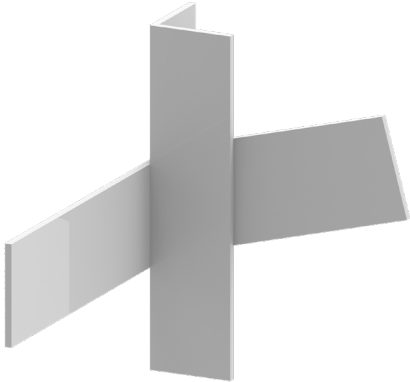
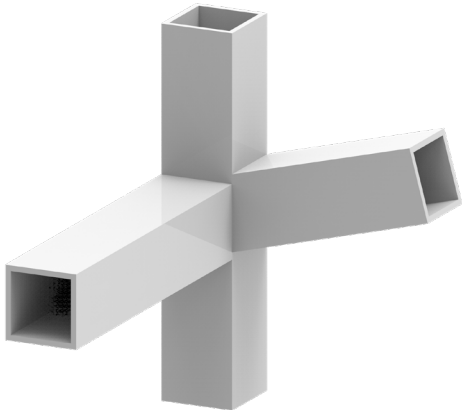
Reflection on Mockup

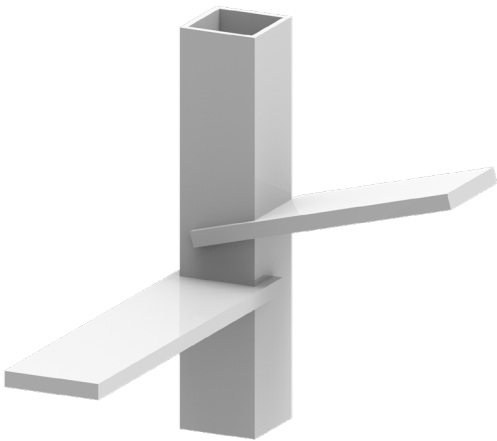
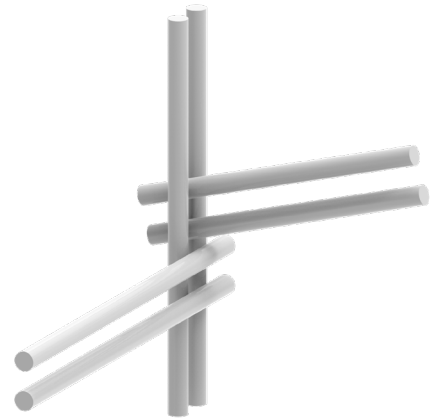
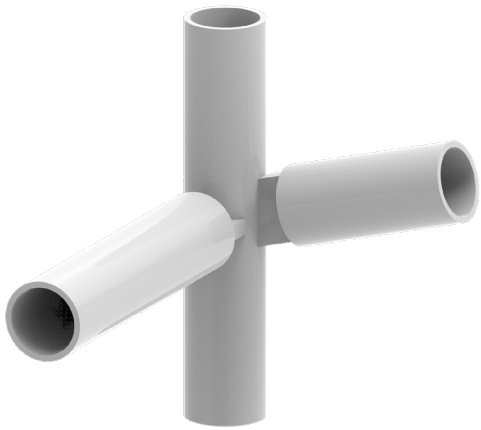
The mockup in wood has successfully achieved intended function to withstand weight on both shelves and hanger even though the limit is rather low, especially on the hanging function. But predictably the final prototype in metal should greatly improve the situation. The joining methods of the wooden mockup are mostly nails and glue. And in the final prototype the joining will be welds and machine screw connections for the most part.

The mockup also calls for revision of material profile in the final prototype. The woods are cut in square slats, which presents difficulties joining the parts into a tapered shape. Nails and screws have achieved putting parts together thanks to the flexibility of wooden material, but in the construction with metal this phenomenon can be more difficult to handle. The edges of square angles can also bring discomfort when the design is an unstable, moving object placed indoors.

Form and Construction

In accordance with concerns raised by the mockup process, Profiles of final prototypes', foreseeably steel plus wood, needs to be revised. There are three main considerations here: The difficulty of fabrication, the aesthetics, and the shape friendliness to fit in domestic experiences.







Finalizing

Illustrated on the left is the final design of Living Form #1. Some modification have taken place from the wooden mockup's design to this version. Profile of legs has switched from square to circular comprehensively considering both the fabrication difficulty and the form language. Same design decision happened to the hanger grid as well, planning to joint 10mm tubes with laser-cutted rectangular bracings. Connection designs between different parts also have changed dramatically, almost re-designed, to make sure the prototype's structure is guaranteed. Heavy-duty casters have also been integrated into the design by designing a angled connector that fits into the tube's bottom

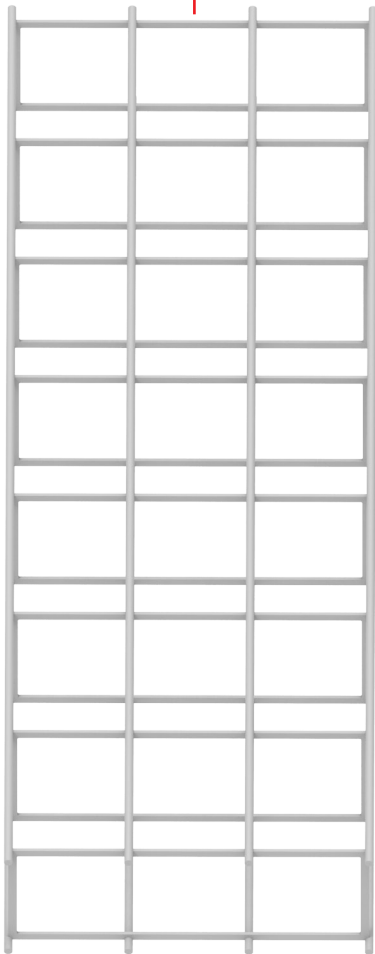


Parts

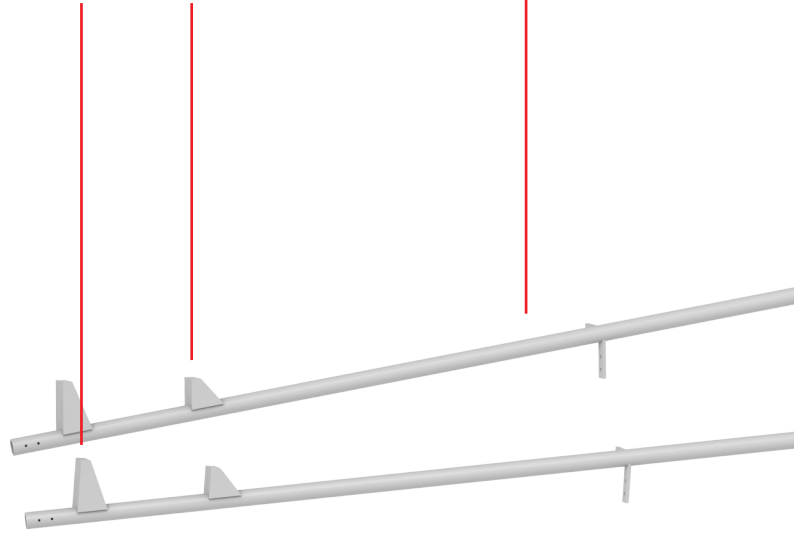
cap to stabilize legs



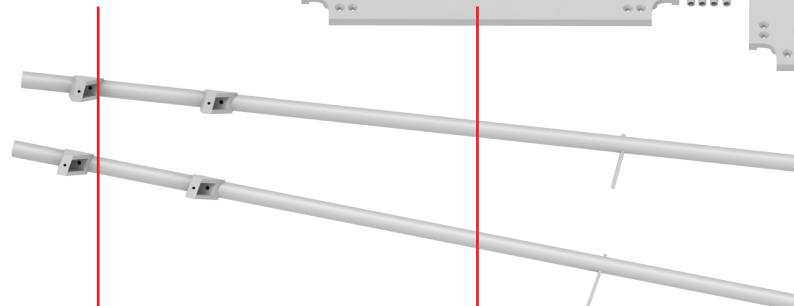
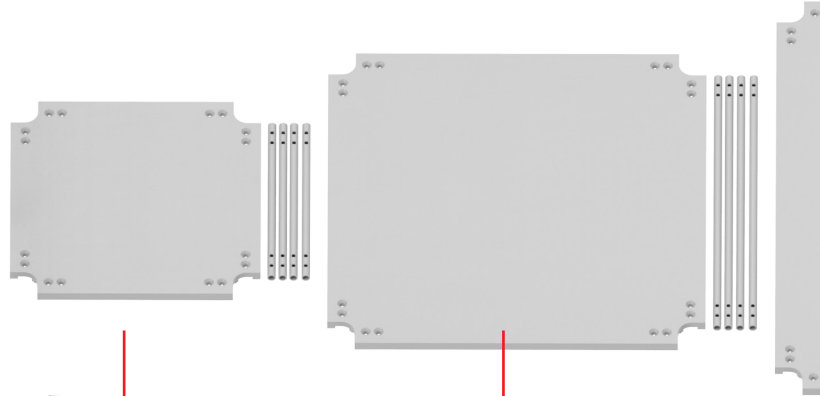
hanger



triangular connectors between legs and hanger

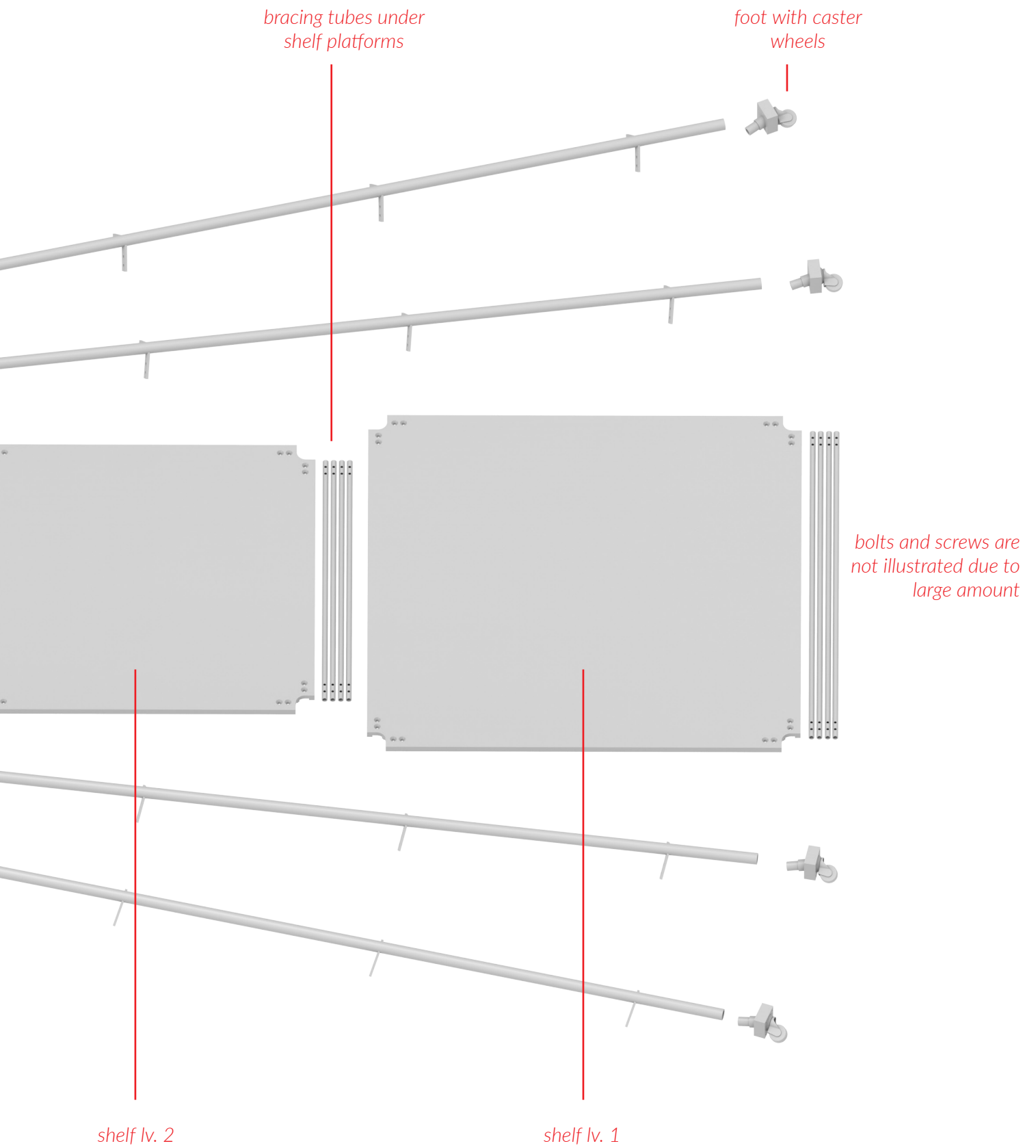


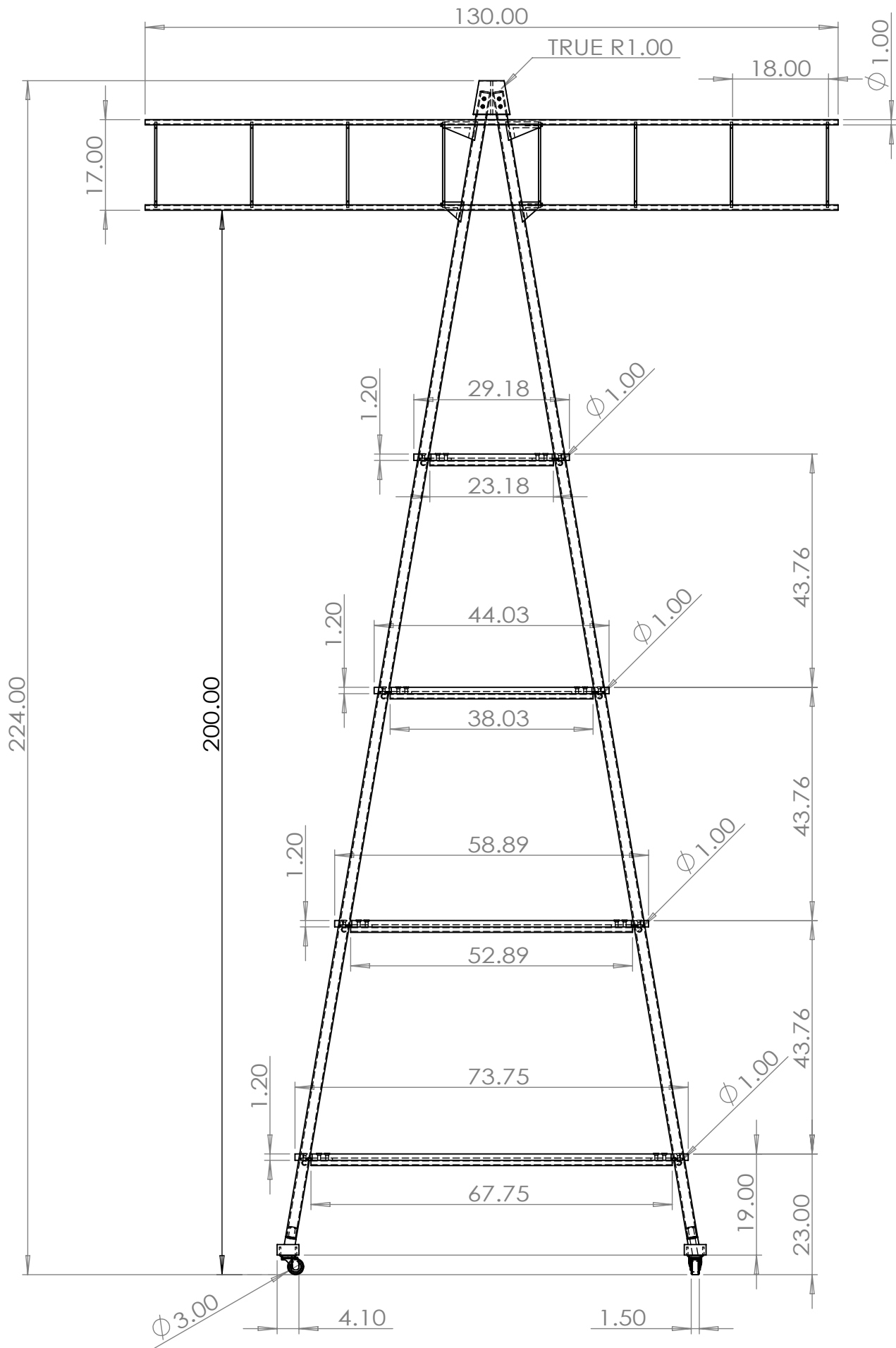
legs



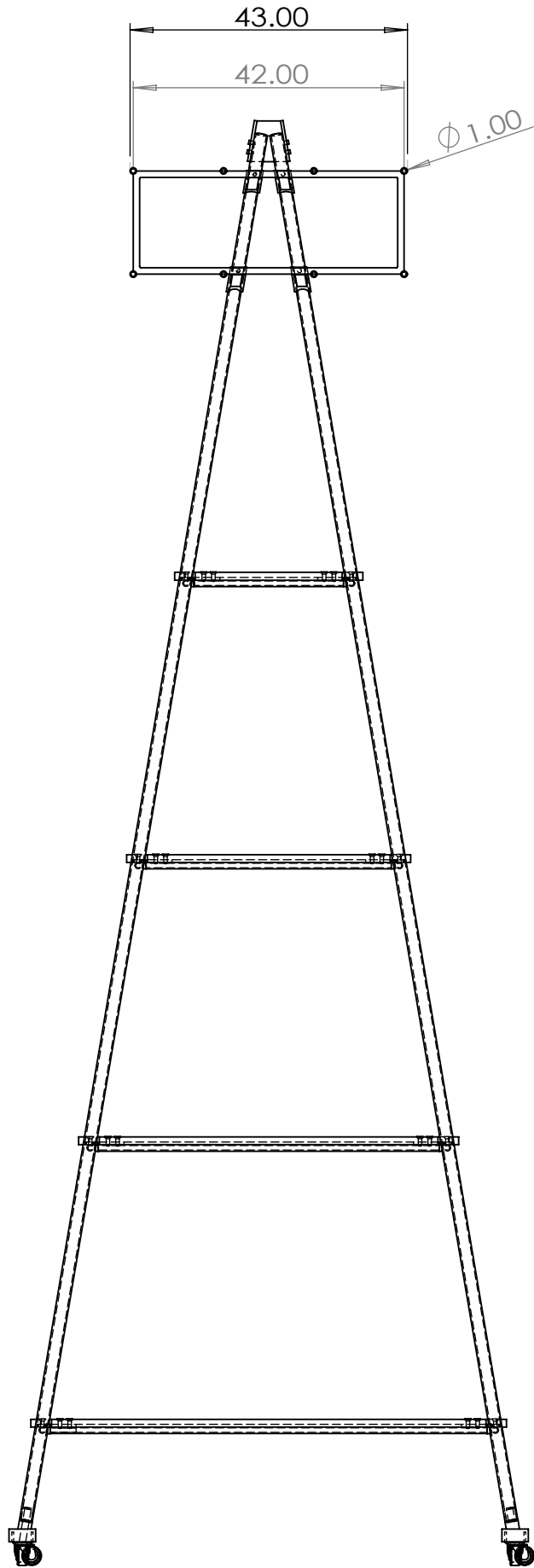
shelf lv. 4

shelf lv. 3

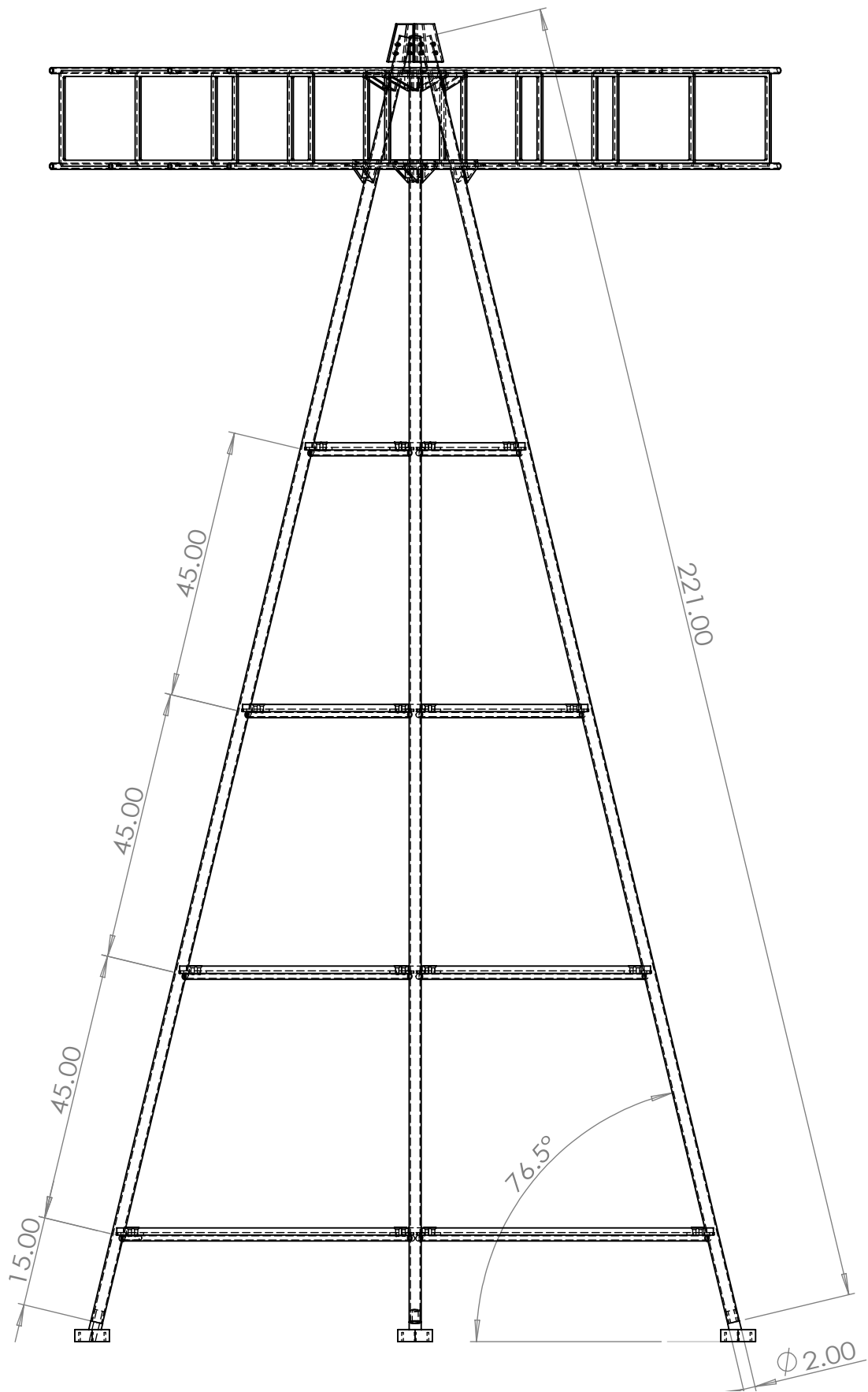




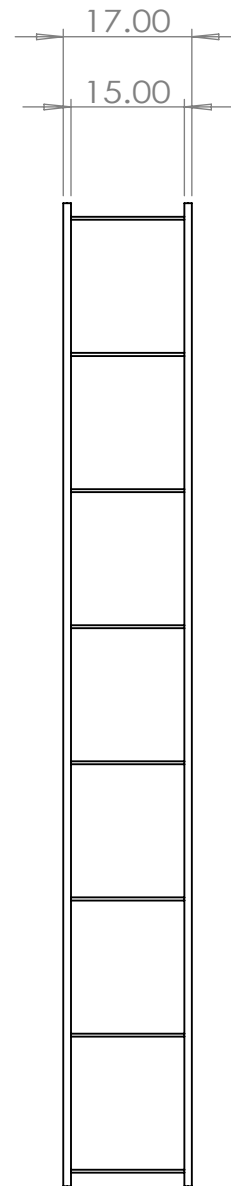
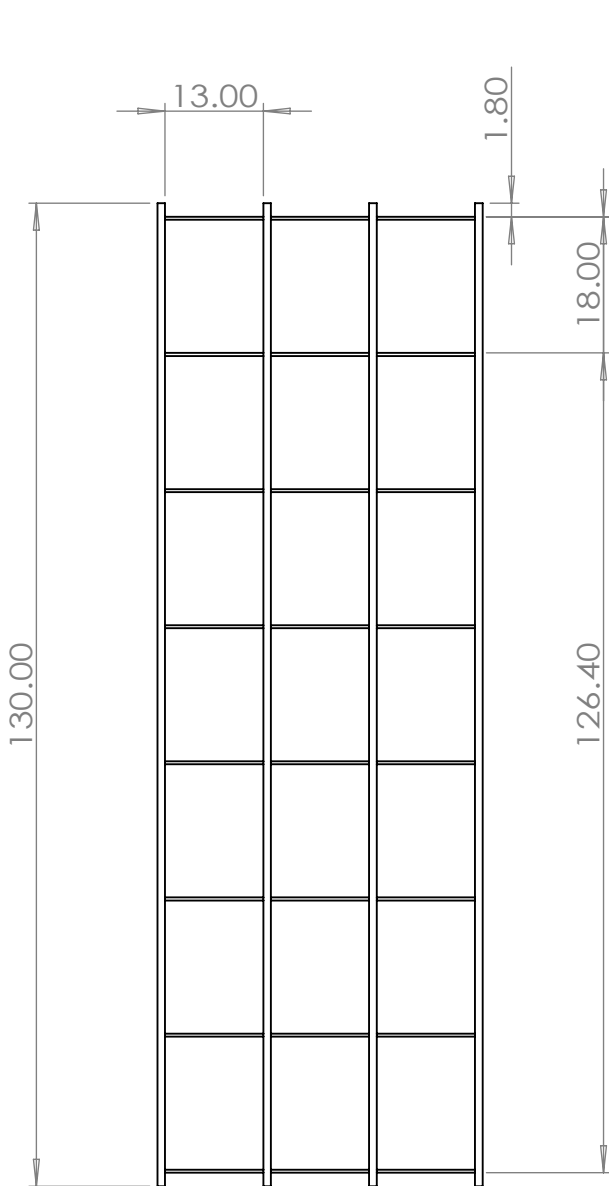
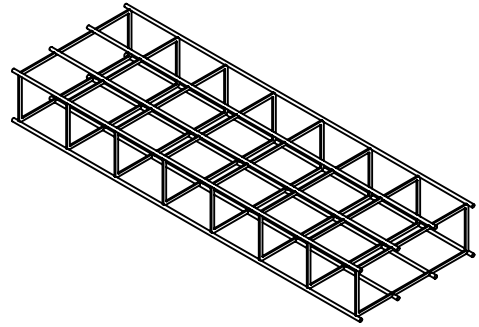
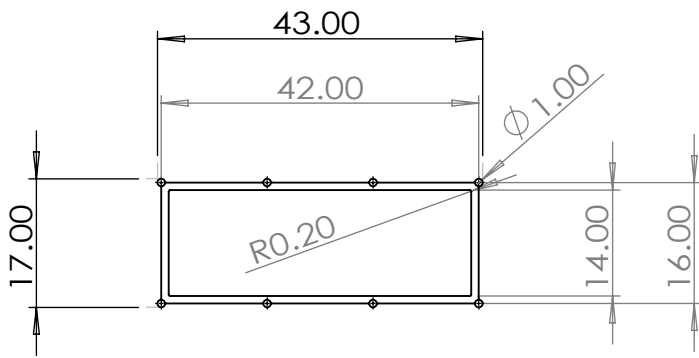
Living From #1 front view
Unit: cm



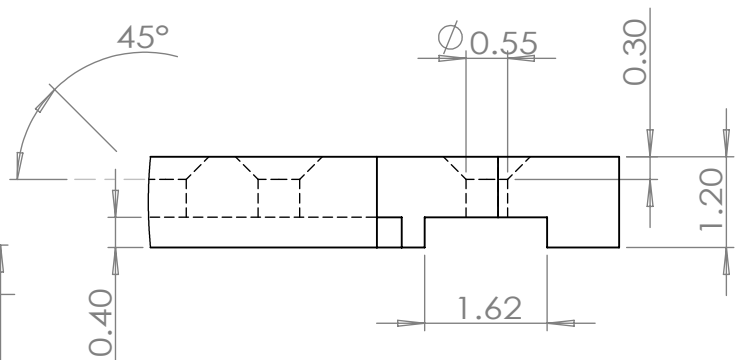
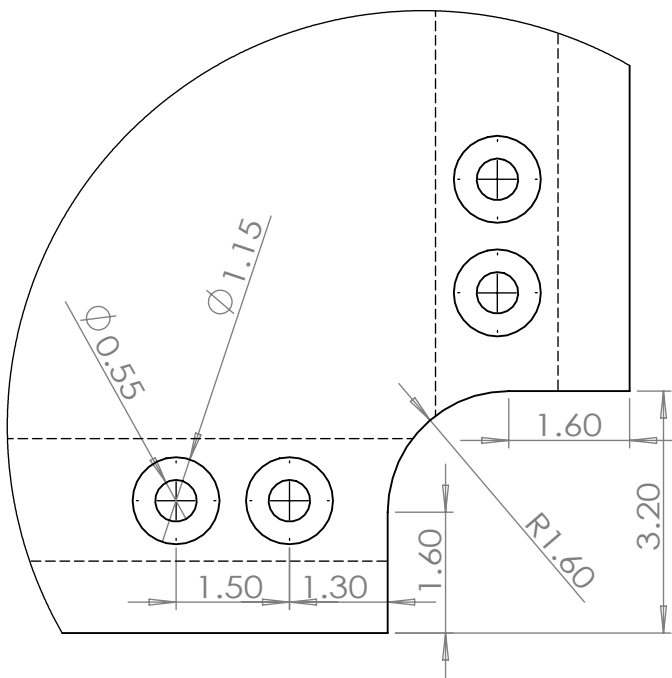
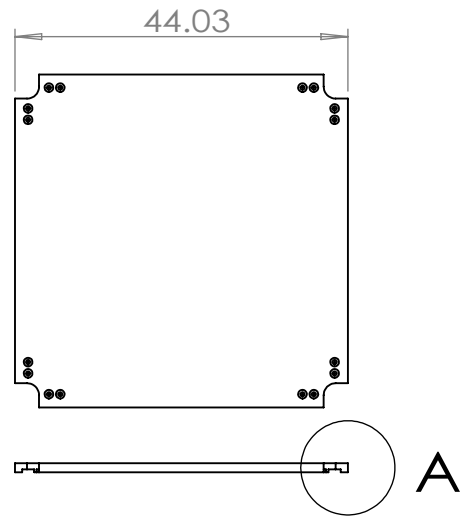
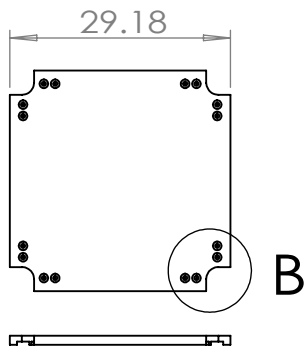
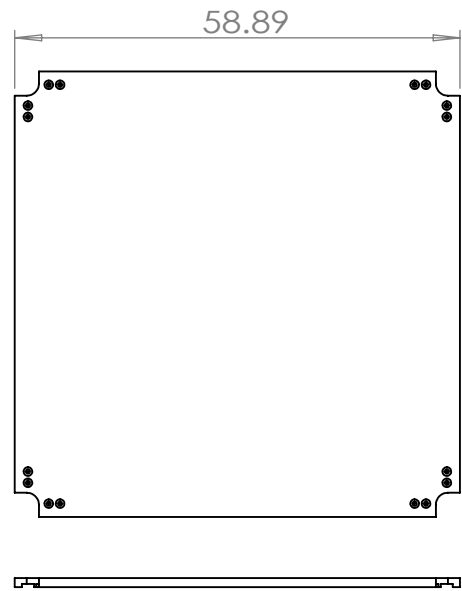
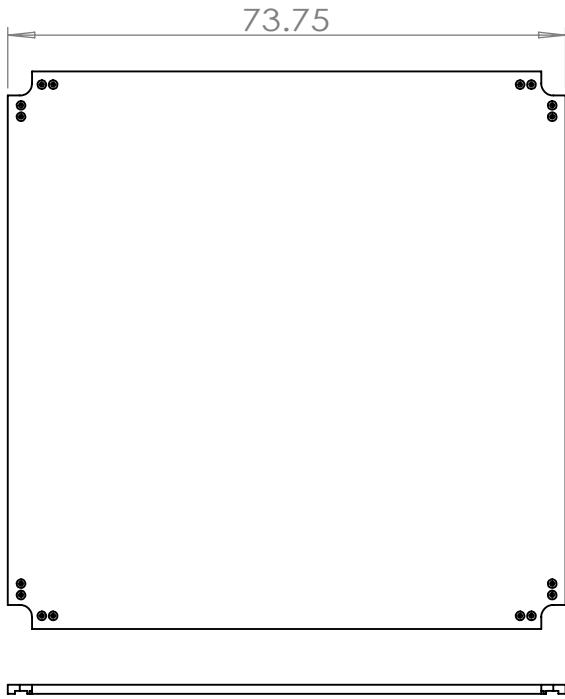
Living From #1 side view
Unit: cm



Living Form #1 relative view
 True to leg tapering angle
 Unit: cm



Hanger
Unit: cm



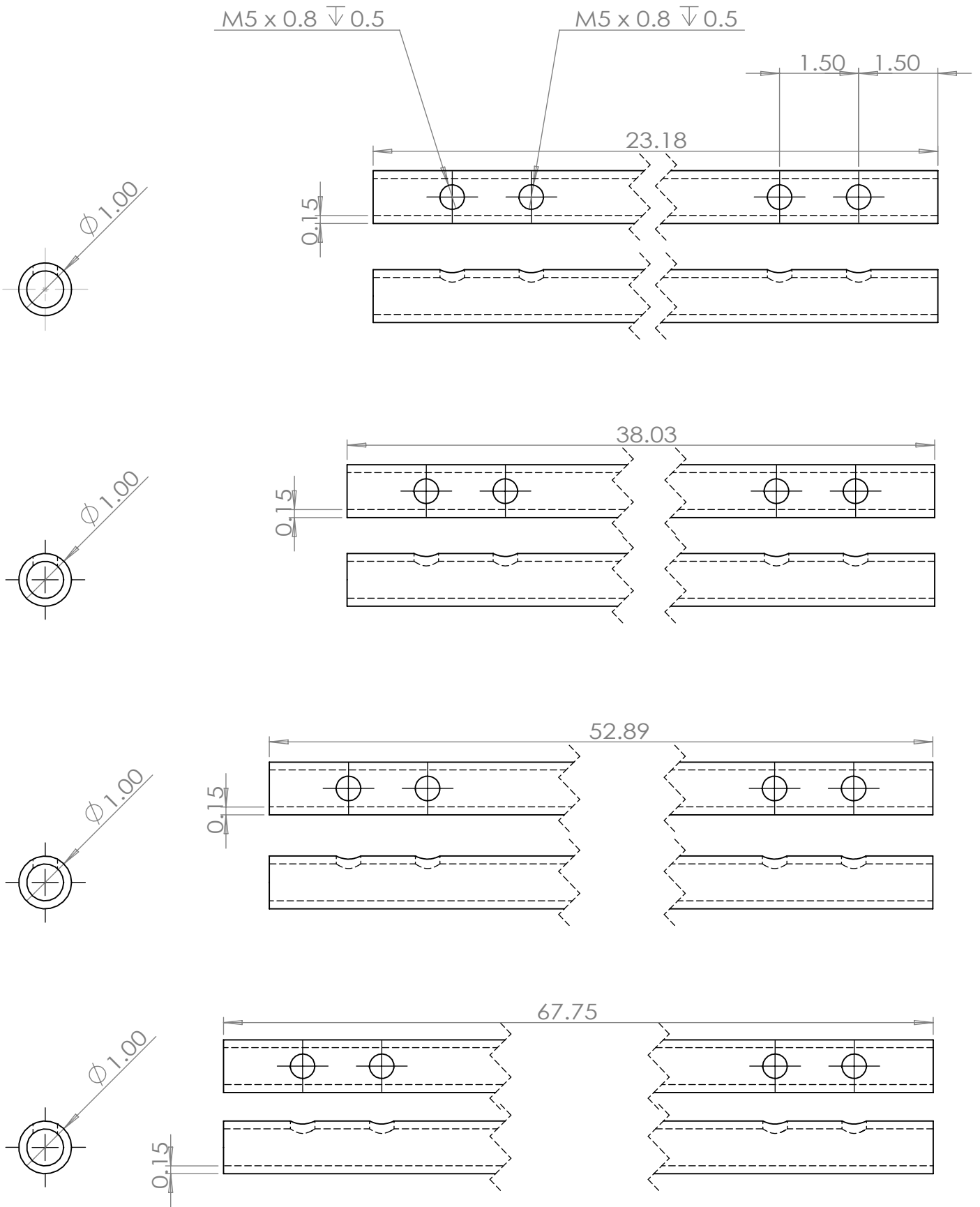
DETAIL A

SCALE 1 : 1

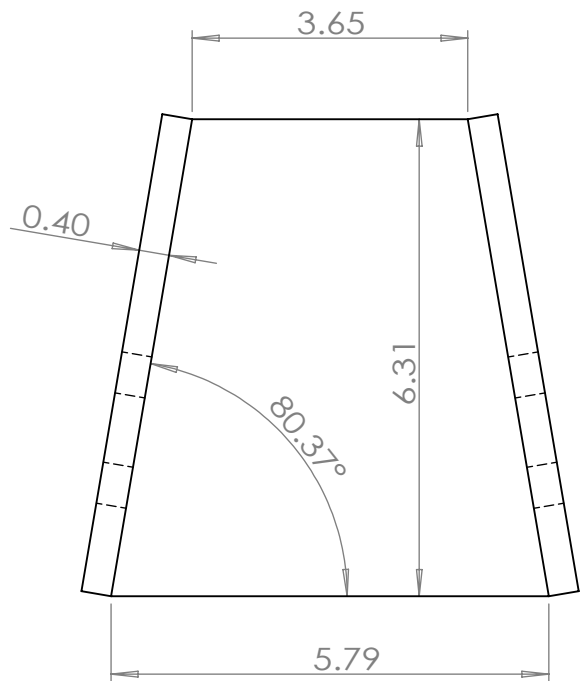
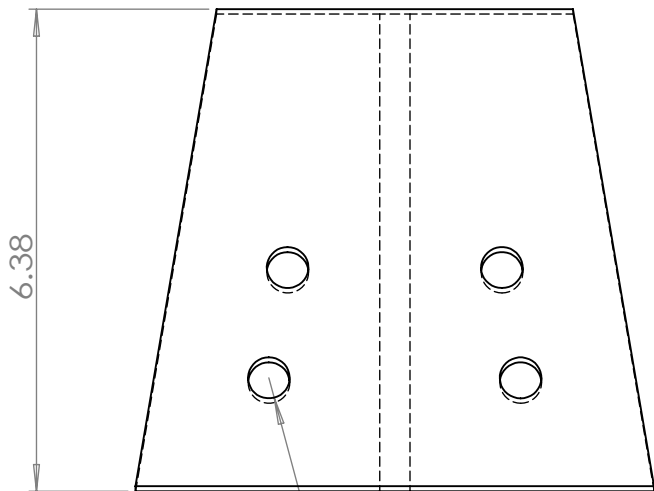
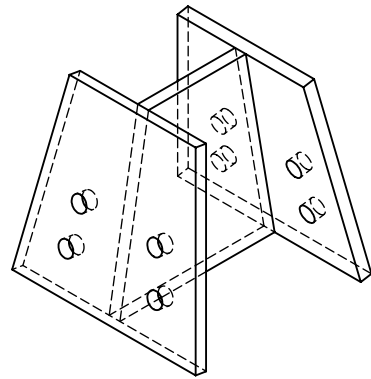
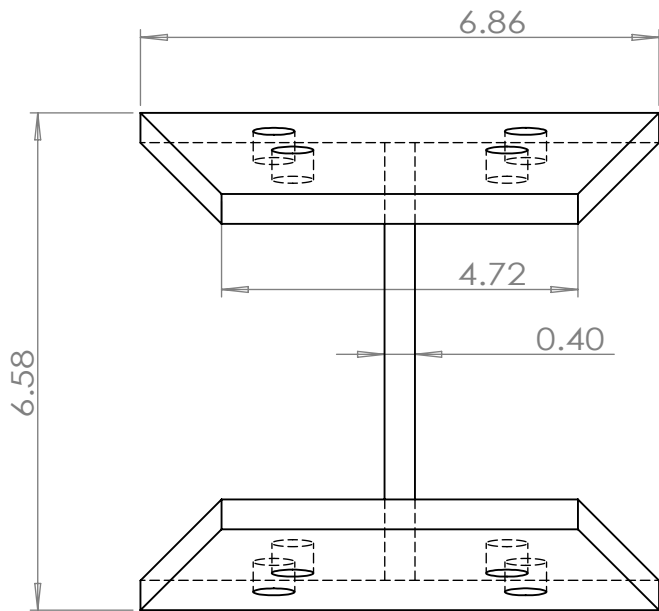
DETAIL B

SCALE 1 : 1

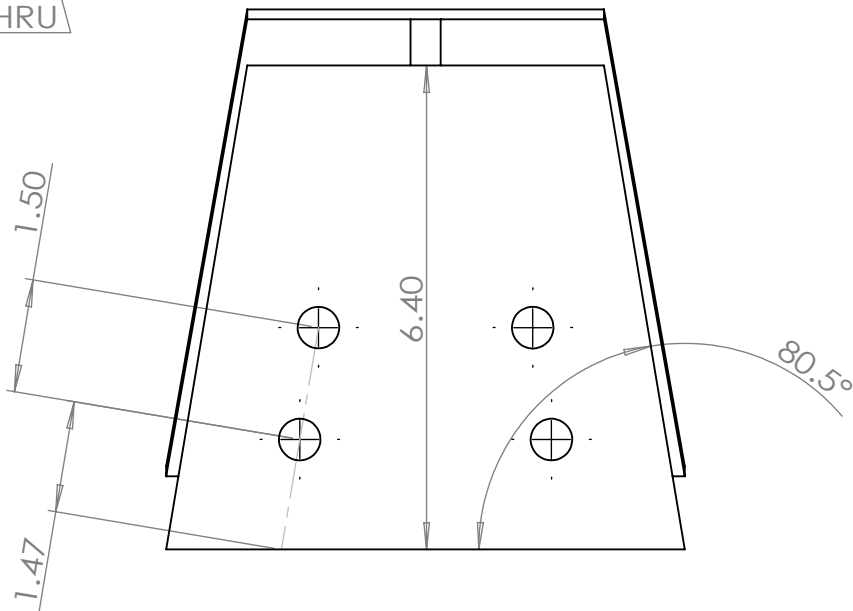
Shelf platforms
Unit: cm



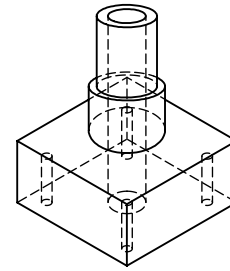
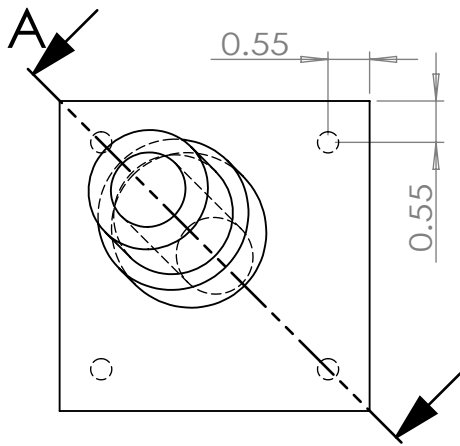
Bracing tubes
Unit: cm



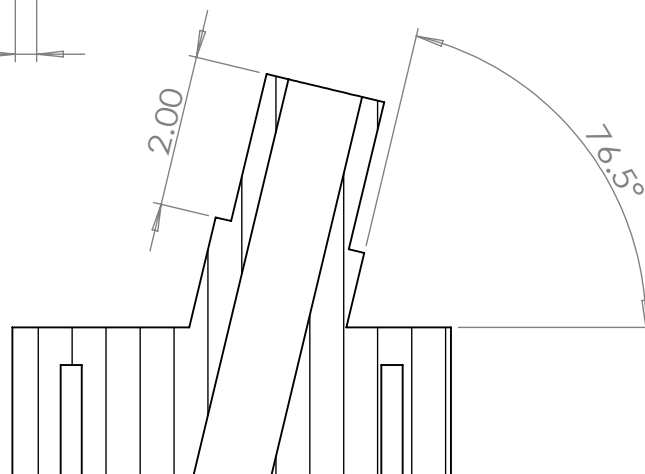
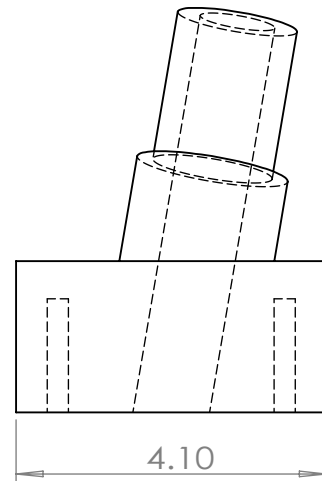
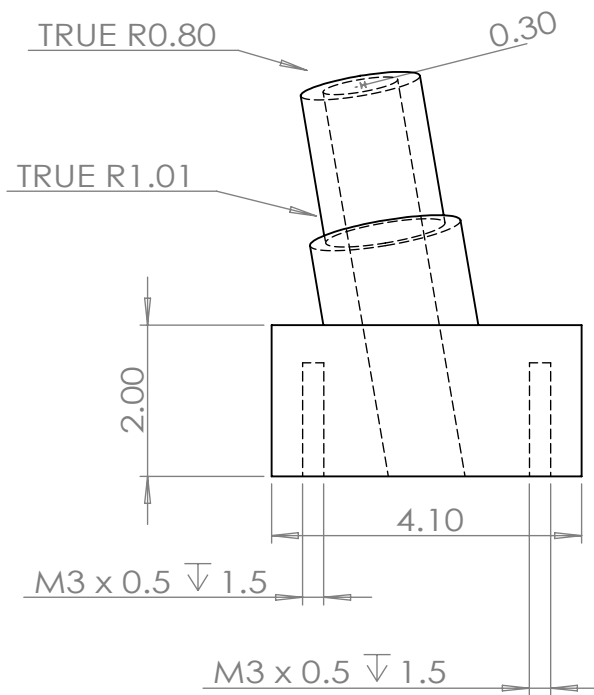
R0.28 THRU



Cap
Unit: cm



A



SECTION A-A

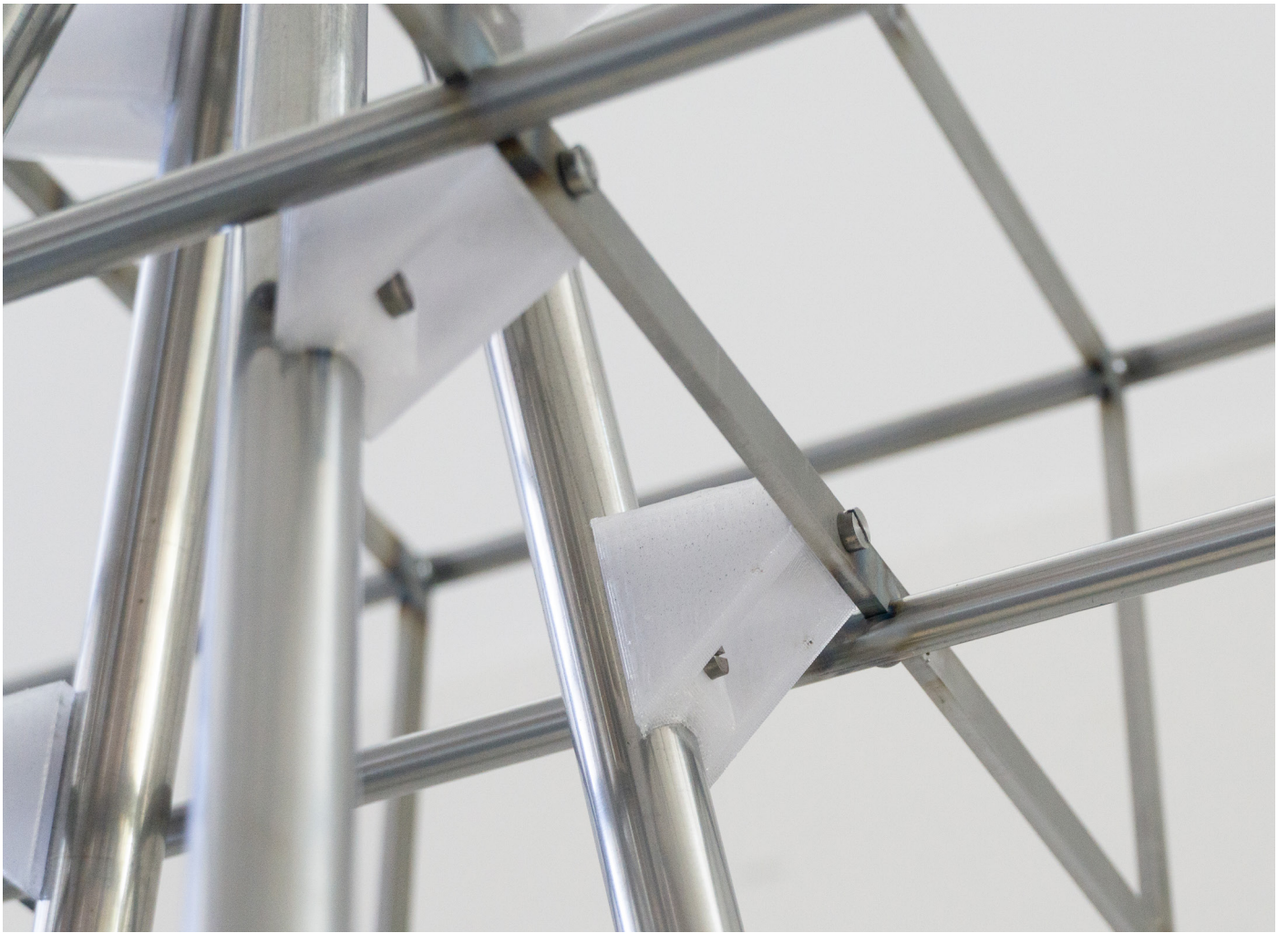
SCALE 1 : 1

Foot
Unit: cm











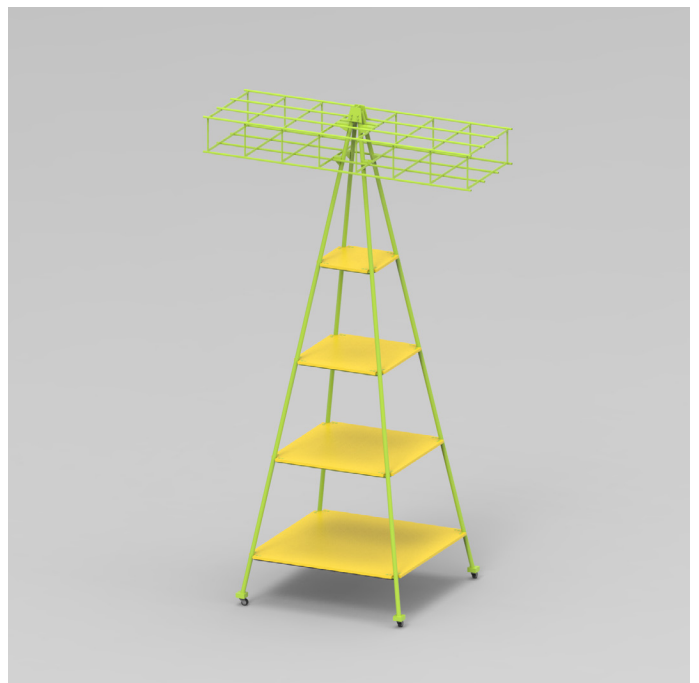
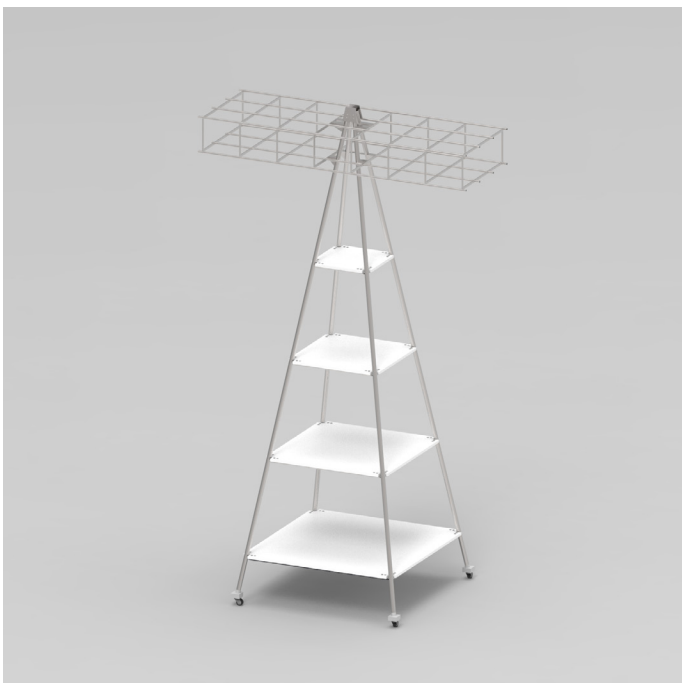
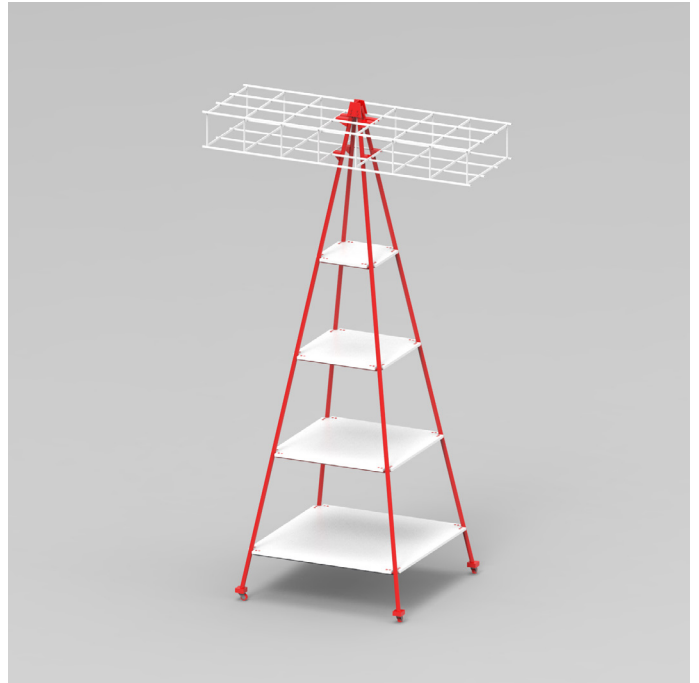


CMFs

The final prototype uses 20mm diameter steel tubing, 10mm steel tubing and 4mm thick sheet steel for the rest metal parts, i.e. rectangular frames, top cap and some small bracket parts. Pine plywood boards are used for the shelves. 3D printed PET pieces are also developed to temporarily replace metal or PP/HDPE/nylon parts that is beyond my individual effort to produce at this point, inclusive of the wedge units connecting the hanger frame and the bottom tower, and the foot pieces that's holding the caster wheels. The design is assembled all-over with M5 x 0.8 slot-headed machine screws.

The assembled structure for the presentation shows the prototype in a bare structure with only wax coating applied on the steel surface for rust prevention. I had long debates whether or not the design should be "properly" finished with either color coating, painting or plating, and the answer is that it depends on the larger context that includes the user side, hence their visual expectation and interpretation of the object. To me there is another major consideration, which is the direction this project possibly carries to. The possibility to integrate more pieces of furniture designs into this discussion of mobility will have a stronger force on deciding the holistic visual presentation.

The decision to not "finish" the project for the degree project, benefit the articulation of concept, that, as a kind of form out of speculation instead of fitting into a certain box on a furniture catalog, covering original material and adding color into calculation makes the presentation instead more chaotic. The bare honesty in design's choice of material links closely with the utilitarian value I want to convey.





Project outlook

It has been a recurring theme in this book that the Living Form project, as a groundwork I am preparing for myself, will keep evolving, and lead to more possible designs. And to focus solely on Living Form 1 there are still many works that can be done in the near future to make it a more powerful piece of work.

1. Material choice.

For the current design, meaning to keep the general profile of parts and design configurations unchanged, alternative materials can be considered as potential improvements: Aluminum or stainless steel are ideal material choices for the metal structure, and offers better performance than mild steel in case I want to keep finishing works at a minimal level. Aluminum is dramatically more lightweight than steel, and making it suitable to lower center of weight. The plywood shelf boards are subject to change as well. One option I am interested in, besides painting/coating, is to use thinner profile plastic boards instead.

2. Structure improvement

Parts and connections are subjects to redesign for improvement in different aspects. So far all screws are connected without any locking/shock absorbing mechanism, making the design fragile in the way that parts can come loose in the long run. The thread engagement can be improved as well by introducing a better hardware system. Currently, the engagement level for many screw connections is low since many hole tappings were done on the tube walls directly and only the tube thickness was used for threads, ranging from only 1.5mm to 2mm.

3. Packaging and User Assembly experience

The original intention to design every part to assemble the prototype, instead of welding the whole structure together like a piece of installation/sculpture, is the long-term expectation for Living Form 1 to be manufactured and produced. In that respect, the ability to efficient packaging has been well-considered (shown as the early parts illustration). The assembly experience, however, is way below the point of satisfaction. The assembly process of the prototype ultimately turned out to be too difficult to handle by one, and with the help of another pair of hands, the job was done with certain struggle. The main reason behind is that the current parting plan makes it impossible to slide in any shelf board once the legs have been set up upright in the tapering angle. It has to be put together in the order in which two leg tubes get fastened with the shelves, and then the other two make their connection while the whole structure is lying down. Respecting that I see that either a thorough instruction plan is needed, or the parts need to be redesigned for better assembly experience.

I will be moving to another apartment (unfurnished) soon, where I want to put the prototype in use. And in my expectation, I hope to see the organic and mobile relation between me and the design. Where habits/ritual/customizations are developed, and new ideas spark out in the process.

And finally, In the vision to design the next object for this proposal, Naturally I am thinking about the table mentioned earlier...

References:

1. Colquhoun, A. (2002). *Modern architecture*. United Kingdom: Oxford University Press. 144-145
2. Gardinetti, M. (2014, August 24). *Le Corbusier Domino: Soporte independiente, planta libre y planos verticales autónomos*. Tecne. Retrieved June 1, 2023, from <https://tecnne.com/le-corbusier/domino-uno-a-uno/>
3. Friedman, A. (1995). *The Evolution of Design Characteristics during the Post-Second World War Housing Boom: The US Experience*. *Journal of Design History*, 8(2), 131-146. <http://www.jstor.org/stable/1315979>
4. Walsh, T. (2013, November 10). *The Modern Way*. Apollo. <https://www.apollo-magazine.com/modern-way/>
5. Maher, C. (2018, October 6). *CAP-MARTIN AND VILLA E-1027. THE WOODEN HOUSE*. Retrieved July 1, 2023, from <https://www.thewoodhouse.ny.com/journal/2018/10/6/cap-martin>
6. Allen, G. (2018, June 29). *Lights and Mirrors at Eileen Gray's E-1027*. Greg.org. Retrieved June 20, 2023, from <https://greg.org/archive/2018/06/29/lights-and-mirrors-at-eileen-grays-e-1027.html>
7. Kemery, B. (2006). *Yurts: Living in the Round*. United States: Gibbs Smith. 28-29.
8. Hairihan. (2002). *Extension of the Culture of the Mongol Yurt On the Distribution and Direction of the Inner Space of Mongolian Houses*. *Journal of Asian Architecture and Building Engineering*, 1(2), 227-231.
9. Fabrizi, M. (2016, February 7). *Pao: Dwellings For the Tokyo Nomad Woman by Toyo Ito (1985 and 1989)*. SOCKS. Retrieved June 29, 2023, from <https://socks-studio.com/2016/02/07/pao-dwellings-for-the-tokyo-nomad-woman-by-toyo-ito-1985-and-1989/>
10. Tomita, A. (2021, February 1). *言葉と空間と脳。境界線のない建築を目指す、伊東豊雄【中野信子の脳探検】*. VOGUE Japan. Retrieved June 29, 2023, from <https://www.vogue.co.jp/lifestyle/article/brain-xxpedition-nobuko-nakano-toyo-ito>
11. De Duve, T. (2020). *Bernd & Hilla Becher: Basic Forms*. Germany: Prestel Publishing. 5-15.
12. Isaacs, K. (1974). *How to Build Your Own Living Structures*. United States: Harmony Books.
13. Snodgrass, S. (2015, November 16). *Enter the Matrix: An Interview with Ken Isaacs*. WALKER. Retrieved July 1, 2023, from https://walkerart.org/magazine/enter-matrix-interview-ken-isaacs#_ednref1
14. Visibilia (n.d.). *The Munari Cockpit*. STILEDDESIGN. Retrieved July 1, 2023, from <https://www.stiledesign.it/en/icons/abitacolo-munari-design-bruno-munari/>
15. Propst, R. (1966). *The Action Office*. *Human Factors*, 8(4), 299-306.
16. George Nelson Foundation (n.d.). *Action Office 1 (A01)*. George Nelson Foundation.org. Retrieved July 1, 2023, from <http://www.georgenelsonfoundation.org/george-nelson/works/action-office-1-a01-132.html>
17. Whalebone (n.d.). *AN INTERVIEW WITH THE INVENTOR OF THE CUBICLE*. WHALEBONE. Retrieved July 1, 2023, from <https://whalebonemag.com/an-interview-with-the-inventor-of-the-cubicle/>

Image Captions:

Unlisted images credit to the author

- p14 Scale model of Maison Dom-ino, c. 1914, Le corbusier. ©FLC/ADAGP. Retrieved from: <http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=5972&sysLanguage=en-en&itemPos=102&itemCount=215&sysParentId=65&sysParentName=home>
- p15 ESU (Eames storage unit), c.1949, Charles and Ray Eames © 2011 Eames Office LLC (eamesoffice.com); © Herman Miller, Inc. Photo © 2011 Museum Associates/LACMA. Retrieved from: <https://collections.lacma.org/node/252159>
- p16 Villa E-1027 interior. Retrieved from: <https://www.dezeen.com/2021/08/27/eileen-gray-e-1027-villa-renovation/>
- p17 Mirror in E-1027 for shaving the back of one's head, Eileen Gray. Image by Greg Allen. Retrieved from: <https://greg.org/archive/2018/06/29/lights-and-mirrors-at-eileen-grays-e-1027.html>
- p18 A mongolian ger. Image by Patrick Schneider. Retrieved from: <https://notesofnomads.com/mongolian-gers/>
- p19 A typical plan for a traditional Kyrgyz yurt, 2010. Image by Paul Oliver. Retrieved from: https://www.solaripedia.com/13/318/3692/yurt_floor_plan.html
- p22 Tokyo Nomad Girl Kazuyo Sejima and furniture in Pao 1, 1986. Image by Tomio Ohashi. Retrieved from: <https://www.architectural-review.com/essays/reputations/kazuyo-sejima-1956>
- p23 Axonometry of Pao 1 & 2. Retrieved from: <https://socks-studio.com/2016/02/07/pao-dwellings-for-the-tokyo-nomad-woman-by-toyo-ito-1985-and-1989/>
- p24 Pao 1 and its furniture designs. Retrieved from: <https://www.architectural-review.com/essays/reputations/kazuyo-sejima-1956>
- p27 Aerial view of Tokyo. Retrieved from: <https://imgur.com/gallery/pReCA1c>
- p32U Anonyme Skulpturen book cover, 1970. Retrieved from: <https://www.amazon.com/Anonyme-Skulpturen-Bernhard-Hilla-Becher/dp/392122408X>
- p33U Beach Matrix, installation view in Westport, Connecticut, c.1967, Ken Isaacs. Retrieved from: https://walkerart.org/magazine/enter-matrix-interview-ken-isaacs#_ednref1
- p33D Superchair, 1967, Ken Isaacs. Retrieved from: <https://www.smow.com/blog/2015/10/smow-blog-compact-walker-art-center-minneapolis-present-hippie-modernism-the-struggle-for-utopia/ken-isaacs-superchair-1967/>
- p34U Sketch of Alpexpo, palace of exhibitions. Grenoble, 1967-1970, Jean Prouvé. Retrieved from: <https://diariodesign.com/2021/03/el-universo-industrial-de-jean-prouve-en-caixaforum-madrid/>
- p34D Highway service stations Total, 1968-1973, Jean Prouvé. Retrieved from: <https://diariodesign.com/2021/03/el-universo-industrial-de-jean-prouve-en-caixaforum-madrid/>
- p35U Abitacolo, c.c1971, Bruno Munari. Retrieved from: <https://www.munart.org/>
- p35D Drawing of Abitacolo. Retrieved from: <https://www.multiplo6.com/abitacolo-multifunctional-bed-structure-by-bruno-munari-1971/>
- p43U NEST WE GROW, 2014, College of environmental design UC Berkeley and Kengo Kuma associates. Retrieved from: <https://projects.archiexpo.com/project-29999.html>
- p44 Action Office I, 1964, Vitra Design Museum Archive Retrieved from: <https://www.sacurrent.com/arts/george-nelson-retrospective-at-the-mcnay-2241400>
- p45 Archival photo of Action Office System with computer terminals, Herman Miller. Retrieved from: <https://www.hermanmiller.com/products/workspaces/workstations/action-office-system/design-story/>
- p62 Transmission Towers in São Paulo, screenshot from the movie scene, 2021, Alexandre Moratto, 7 Prisoners.

This is the end of documentation.



Thank you! I hope my work has been an inspiration

