BLOOM

An antifragile approach to designing long lasting furniture and embracing the aging of wood.

LUND UNIVERSITY

Klara Blomsterberg

Degree Project for Master of Fine Arts in Design 2023

“How to love the wind
Wind extinguishes a candle and energizes a fire. Likewise with randomness, uncertainty, chaos: you want to use them, not hide from them. You want to be the fire and wish for the wind.“

Nassim Nicholas Taleb, *Antifragile - Things That Gain from Disorder*

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ABSTRACT

The main goal of this project is to explore tools for consumers and designers when consuming or developing long lasting furniture and translating the results into a product. The short life span of today's furniture is due to design and material choices hindering graceful aging. This contributes to fast furniture, discarded prematurely due to breaking or aesthetic downgrading.

After a literature study and conversations with field experts, I utilized my acquired knowledge on physical models. For increased longevity, I used solid pine, design form language for graceful aging, easily maintained and repairable parts, and material thickness allowing for variation. These measures encourage care, emotional bonds and creating memories.

Antifragility is incorporated through the preservation technique yakisugi and an empirical design process. The result is a comfortable lounge chair.

Thoughtful design decisions create longer lasting and more sustainable furniture.

SUMMARY

My primary focus lies within the area of sustainable furniture design, approached through the lens of longevity and durability. Fast furniture is getting more spotlight and is now being questioned. The unsustainability of the fast consuming and quickly throwing away of furniture is not in line with the 12th UN Sustainable Development Goal. It is in both consumers and designers interest to create and develop a more sustainable consumption of furniture.

The concept of antifragility is a key component of the design process. The Japanese wood preservation technique known as "yakisugi" exemplifies an antifragile approach, resulting in enhancements to wood resilience. Through subjecting the wood to extreme heat stress, this method reinforces its resistance to factors such as decay, moisture, pests, and fire.

In our present mindset, there exists an inclination towards uniformity and homogeneity, despite the contrasting beauty of the randomness in nature. Embracing non-homogeneity by allowing the natural pattern of the wood pieces to be the focus. The soft transitions accentuate these so-called flowers and allow for a graceful aging of the soft pine.

Using time as an ingredient and allowing for natural wear and tear, BLOOM will age gracefully and gain character over time.

PREFACE

This master's thesis was written during spring 2023. My aim with the degree project was to demonstrate my ability to practice the knowledge and skills I have acquired during my masters education, and to independently produce an end-to-end project as an industrial designer.

KEY WORDS

Patina(tion), graceful aging, antifragile, material change, furniture, yakisugi

SAMMANFATTNING

Det primära fokusområdet som behandlas i detta projekt är hållbar möbelproduktion samt konsumtion med inriktningen långsiktig hållbarhet. Fast furniture är ett koncept som fått uppmärksamhet och möbelindustrin ifrågasätts nu. Den ohållbara konsumtionen och produktionen av fast furniture är inte i linje med det 12:e målet för FN:s hållbara utveckling. Det är i både konsumenterna och formgivarnas intresse att skapa och konsumera hållbara möbler.

Konceptet antifragile är ett nyckelbegrepp i detta projekt. Den experimenterande designprocessen och den japanska träkonserveringstekniken "yakisugi" exemplifierar ett antifragile tillvägagångssätt.

I vårt nuvarande tankesätt finns en benägenhet att skapa och önska homogena resultat av möbler, trots den förföriska skönheten i naturens slumpmässighet. Genom att omfamna icke-homogenitet låter jag det naturliga mönstret i träbitarna vara i fokus. De mjuka övergångarna framhäver det blommiga mönstret och möjliggör ett graciöst åldrande av det mjuka furuträet.

Att använda tiden som ingrediens och tillåta naturligt slitage kommer BLOOM åldras graciöst och få karaktär över tid.

FÖRORD

Mitt masterprojekt påbörjades och färdigställdes under våren 2023. Syftet med examensarbetet var att utveckla och demonstrera min förmåga att tillämpa de kunskaper jag förvärvat under min utbildning, och att självständigt producera en färdig produkt, från start till mål, som en industridesigner.

NYCKELORD

Patina(patinering), graciöst åldrande, antifragile, materialförändring, möbler, yakisugi

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INTRODUCTION

BACKGROUND

During spring 2023 I received a wooden lounge chair from my grandparents. Even though the chair was more than 50 years old and had been outside for numerous months, it was still in very good condition. The refurbishing was joyful, cheap and the chair felt as new afterwards. This lingered with me and motivated me to explore the topic, gain a greater understanding and knowledge of long lasting furniture.

Fast furniture is getting more spotlight and many people are questioning fast furniture. The problems with fast furniture is not as well known as fast fashion is. I want to highlight this issue by focusing on how to analyze good quality furniture and what makes long lasting furniture. This way consumers and designers can have a better understanding of why fast furniture is unsustainable and how they can reflect on the topic.

The reason fast furniture is unsustainable is a complex issue that needs to be viewed from many perspectives. It is important to stress that every category of furniture needs to have a range of pricing and the way we treat our belongings is not only determined by price. Although, there are general assumptions that can be made. The complexity of pricing will be discussed in the summary of findings.

Due to global digitalization our consumption patterns have changed drastically. It has never been easier to consume and there have never been more reasons to consume. Around-the-year sale campaigns, limited editions, collaborations and trends all add up to encourage consumption. Sommar and Helgeson (2012, 45-57) claim that it is in both consumers' and designers' interest to create and develop more sustainable consumption of design objects. The authors highlight the unsustainability of the fast consumption, and that the quickly throwing away of furniture is not in line with the 12th UN Sustainable Development Goal of ensuring responsible consumption and production patterns (The Global Goals, 2023).

BRIEF

How can designers create antifragile furniture that challenges the mindset of fast furniture?

MOTIVATION

For the last semester of my masters education, I wanted to dive head-first into something I truly enjoy and cherish - namely furniture design. Especially as furniture remained an area where I had not yet deployed my skills as an industrial designer, and produced an object.

I find the field of furniture design especially interesting due to the numerous focus areas the industrial designer might choose, such as from the point of ergonomics, mechanics, material study or production. The focus area of my choosing is on sustainable furniture design. Namely the design and production of long-lasting furniture, with the broader aim to extend the field's body of knowledge through the lens of new vantage points.

AIM

My aim with the degree project was to demonstrate my ability to practice the knowledge and skills I have acquired during my masters education, and to independently produce an end-to-end project as an industrial designer.

PERSONAL GOALS

I viewed this degree project as a medium through which I could challenge myself to explore and acquire knowledge, in what was for me, new domains of industrial design. In addition, the project provided many opportunities to sharpen my skill set across design aids and tools, including 3D design programs and the exploration of cutting-edge generative AI models. Through a hand-on approach, creating countless physical models and mockups, I gained significant experience by the best teacher there is - trial and error.

METHOD

The thesis rests on a great body of knowledge collected primarily through literature reviews, empirical studies, and through interviews with experienced professionals.

ETHICAL CONSIDERATIONS

When conducting a literature review, it is important to uphold ethical principles to ensure the integrity of the research process. It is essential to provide accurate and complete references for all sources utilized in the review and to ensure correct understanding of any secondary references. I must also be mindful of my own ethical principles and recognize that my prior biases may influence the selection and interpretation of articles. Such biases may occur unconsciously and require vigilance to detect. When encountering conflicting literature, incorporating these divergent perspectives may be advantageous for the research endeavor.

I must be mindful of the potential for cultural, gender or other biases that may influence my research findings.

When conducting research about furniture there are several ethical considerations to keep in mind. When involving human participants in my research, I must obtain informed consent before conducting the study. Informing about the nature of the study and their right to withdraw from the study at any time without penalty.

I must also take decisions to minimize any potential harm that may result from my research and design.

ANALYSIS

THE TOPIC

The literature study centers around the topic of long lasting furniture, which can be approached from various angles such as material choice, production, pricing, ergonomics, mechanics, recycling and reusing aspects and so on. The topic raises several questions, including but not limited to, how long lasting furniture can be created, whether it it can be applied in early design stages, what long lasting materials exist and in what sense are they long lasting, how does social structures affect the longevity of furniture, how pricing affect furniture consumption and whether an antifragile method can be applied in the field of design.

Before investigating these questions, I assured that I possessed adequate prior understanding of the furniture field, prior competence to follow through a design process addressing said topic and a budget that allows form experimentation when creating a physical design.

In addition to prior assurance, I assured the topic of long lasting furniture is relevant. Which is pertinent to furniture consumers, both professional and design students as it promotes a sustainable approach to creating, consuming and developing furniture.

QUESTIONS AT ISSUE

With the following questions I aim to investigate the topic.

- What separates patina from degradation?
- How can designers influence product lifetime and encourage long lasting furniture?
- How can antifragile be incorporated into the field of design?
- How does material selection matter?
- Are long lasting objects only for the high luxury brands?

AGING

Aging is something that is inevitable, it is the way of life. Yet we are offered so many ways to prevent this to happen, to stay young looking. The cosmetic surgery and wellness industry are huge. From the skincare industry I believe it is possible to see a shift, a healthier way of viewing aging. They call it Well-Aging or Age-Well. From the niche skincare website from Sweden, Skincity, they state that the best way is to cooperate with time, go along for the ride with an open mind and curiosity (Sara & Yasemin 2023, 00:06:45).

UNDERSTANDING MATERIAL CHANGE

When designing, the present look and feel to the product and material is in focus and the information about how material age and age with use is often not provided. This is therefore often overlooked by designers (Lilley et al. 2019, 417).

When a product is purchased it is exposed to its environment and reacts on heat, light, touch, water, air and so on, which creates wear. Material change like this is often referred to as damage or degradation (Lilley et al. 2019, 417). Material change that is considered degradation or damage can cause premature disposal of a still well functioning product. Premature disposal of fully functioning products can also be triggered by the lack of newness and untouched materials. Patina on the other hand is often referred to as graceful aging and traces of its life are present in its visual appearance. It is often the result of abrasion, polishing, ablation, accumulated dirt, oxidation and so on. The traces of its life have the possibility to create an emotional bond towards the object, showcasing memories (Lilley et al. 2019, 418). Patina can also be described as a societal preoccupation with what wear is acceptable to a certain material and object.

There are a few circumstances that have an impact on how we perceive material change and need to be considered. Has the object been carefully cared for? This includes actions such as cleaning, repairing, maintaining etc. How has the material change happened and are the changes permanent? Depending on how the material change has happened, perhaps accidentally, gradually, a memorable event or rapidly, give different feelings toward the material change (Lilley et al. 2019, 421).

It is difficult to accurately predict how the material of an object will age since the outcome depends on how it has been used and what environment it has been in. What can be known is that sudden changes in material such as the first scratches tend to be negative whereas gradual changes over time are perceived positive. Natural materials are usually more commonly considered to age well compared to synthetic materials. The natural pattern and texture generates less obvious wear and avoids the disappointment of "loss of newness" (Lilley et al. 2019, 421-424, 128).

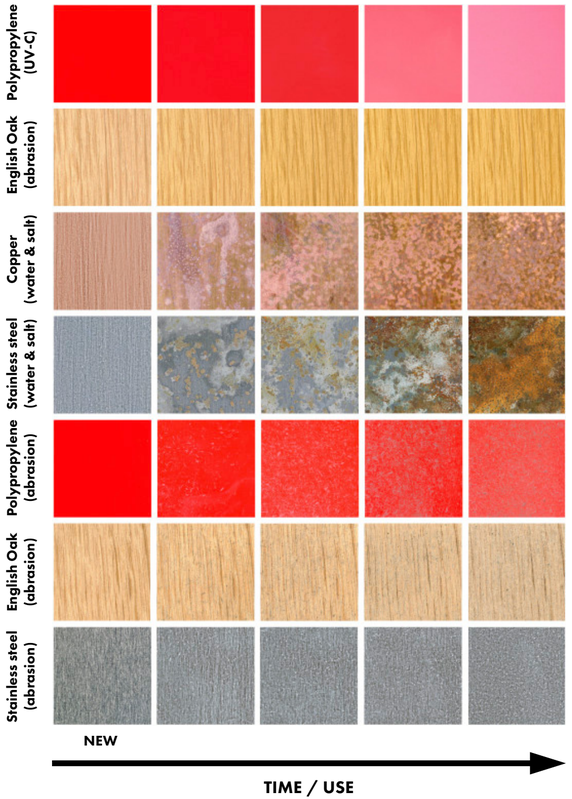
NATURAL AGING IN INDOORS CONDITIONS

The way wood ages is a complex process. The changes happen slowly over time and there are several factors, such as humidity, temperature, UV exposure etc, that determine the outcome. (VARODI, A.M. et al. 2017, 331-332). The most visible indicator of aging is the color change and unfinished wood was more sensitive than finished wood. The finishing that preserves the wood the best and prevents aging (resisted to natural aging exposure) is linseed oil (VARODI, A.M. et al. 2017, 339).

FOR WHOM?

The mindset of patina and material change is different when it comes to shared objects, wear is considered contamination. Therefore it is important as a designer to consider both the material change throughout its lifetime and the intended user(s). There are advanced material libraries yet none that address the materials aging and change with usage. (Lilley et al. 2019, 417-419).

Shown in the picture to the right, material samples present what may happen to materials in use (Lilley et al. 2019, Fig. 5).



THE IMPORTANCE OF MATERIAL SELECTION

During the Furniture Fair in Stockholm 2023 the strive for sustainability was seen everywhere. The focus on repairing services was proudly displayed by the Finnish furniture companies Piiroinen, Artek and the Swedish Stolab. Several talks were arranged for designers to listen in and discuss different approaches to the sustainability of furniture. One of the Stockholm Furniture Fair Talks called Now or never - the power of choosing the right material addressed the context between materials and sustainability. In the panel were Christian Lodgaard Senior Vice President Flokk Design, Shawn McKell Chief Strategy Officer Doconomy, Kristoffer Lundholm Head of Sustainability Sally by EY Doberman and Emma Olbers, Designer. They highlight the complex subject of the CO_2 footprint of material. Some materials can have a bigger CO_2 footprint but have a longer lifetime compared to other materials that have a smaller CO_2 footprint but shorter lifetime. Therefore it is important to choose materials wiseley, keeping the intended lifetime expectancy in mind. The panel emphasized how materials age and how good design can look even better after time. What you buy today will not look the same after 10 years of use and we need to accept that natural look.

Emma Olbers stated her philosophy when designing, form follows planetary boundaries. Designers need to be aware of the limitations and boundaries of the planet when designing for the future. When designing furniture, the material choice stands for the biggest part of CO_2 emissions, see Fig. 1 (Olbers, 2019).

Stolab, Stockholm Furniture Fair 2023

Artek 2023 campaign

Stockholm Furniture Fair Talks 2023:
Now or never

Piiroinen, Stockholm Furniture Fair 2023

WOOD

Solid wood has several advantages over engineered wood products, such as MDF, veneers and chipboards, in terms of aging and repairability. When furniture is crafted from solid wood it tends to age gracefully and develop a desirable patina over time. In contrast to engineered wood which do not exhibit the same aging qualities and may deteriorate more rapidly, impacting their longevity. The repair potential of solid wood furniture is greater compared to engineered wood. Whether it involves filling in scratches, refinishing surfaces or replacing damaged sections, solid wood furniture can be restored to its original condition with relative ease. Compared to repairing MFD, veneers and chipboards can be more challenging.

The use of European woods in furniture creates a natural adaptation for the European climate and humidity levels compared to using tropical woods. Using tropical woods that are incompatible with the local climate and humidity may cause various issues, such as drying out, crack or warp (Ramstedt 2019, 205-206).

Today there is an obsession of homogeneity in designs, everything should look the same. Even when it comes to natural materials. Although, that is not how it looks in nature. When things differentiate from each other are more interesting and feel exclusive (Olbers, 2020).

Wood is often referred to as a living material. It is a hydrometer which means it absorbs and emits humidity in the air. This can be directly visible through curves, warps, cracks and structure at the surface (De Gier & Buur 2009, 38).

WOOD JOINERY

Wooden joints have a rich historical legacy that spans thousands of years, with evidence dating back to ancient Egypt. The importance of considering the lengthwise direction of the grain when working with wood cannot be overstated. When skillfully executed, the utilization of wooden joints results in a construction of remarkable strength and cohesion, resembling an organic entity. There are numerous types of joints and considerations have to be done with construction techniques, material characteristic and aesthetic considerations to keep in mind (De Gier & Buur 2009, 38).

PINE

Sweden is a forest-rich country which means that pine has a well established history and is one of the most traditional building materials (Sweden Svenskt Trä, 2023). Being both lightweight and affordable the material is useful when creating furniture. In general, pine is a soft wood with an uneven hardness and rough fibers. Scratches and dents are prone to be more visible than harder types of wood. Since wood is a part of the natural ecosystem of the atmosphere it does not add any carbon dioxide to the atmosphere (Statens Fastighetsverk, 2021).

FURNITURE EMISSIONS

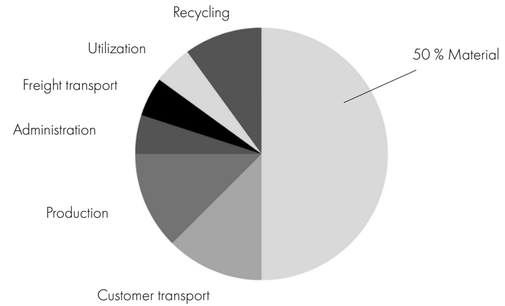


Fig.1

INHERITED LONG LASTING PRODUCTS: CATEGORIES AND DESIGN PROPERTIES

Another way to prolong the lifetime of a product is to pass it on. A study done by Frahm, Laursen and Tollestrup (2022, 1) investigates the properties of inherited products. It resulted in 18 product categories and the most inherited products were kitchenware (24%), furniture (21%) and jewelry (12%). These product categories were then categorized into a group of three overall design properties: emotional (brand and memories), functional (functions) and aesthetic (colors and materials).

Aesthetic

The aesthetic properties of natural materials are more prone to give a graceful aging compared to invented material such as plastic. Natural materials such as wood, paper, stone and leather all have imperfections from the beginning. The variegated surfaces make it difficult to see which material is brand new and which one is aged. Compared to invented materials such as plastic, there are no imperfections when brand new and is often desired to remain perfect. Therefore scratches and dents are highly visible and the aging material is suddenly undesired. The aging of these materials are considered degraded when aging. Materials that have aged gracefully are considered to have patina. Yet this does not define the materials quality of durability or resilience. The authors state that it is a social agreement on how the aged material is perceived.

Fram, Laursen and Tollestrup highlight the importance of a simplistic and "timeless design" with as few ornaments as possible, emphasizing on the functionality of the product design (Frahm, Laursen & Tollestrup 2022, 5).

Functional

Throwing away a well functioning product is inevitable to not feel bad, according to Frahm, Laursen and Tollestrup. Although, passing on a product to someone else does not lead to such negative emotions. Therefore, the high functionality is of key to be kept for longer and passed on to others to enjoy. A well functioning product means it does not rely on other products to function (2022, 10).

Emotional

As a designer there is limited influence over the emotional properties therefore the focus lies on aesthetic and functional properties (Frahm, Laursen & Tollestrup 2022, 14). Despite it often being large in size, furniture is one of the most common products to inherit and pass on. In the study the majority of the inherited furniture had a combination of emotional properties, aesthetic properties and functional properties. A combination of two or more properties increases the chances of a product being passed on (Frahm, Laursen & Tollestrup 2022, 11).

INFLUENCING PRODUCT LIFETIME THROUGH PRODUCT DESIGN

van Nes and Cramer investigated the possibilities for designers to influence the product lifetime and came up with five different design strategies to prolong product lifetime (2005, 286, 295-296). It is important to keep in mind that an extended lifetime is not always preferable. It is not always the most environmentally sustainable according to van Nes and Cramer (2005, 287) and Lilley et al (2019, 419). An example of this is when a new digital product is significantly more energy efficient than the product in possession. In this case an appropriate lifetime is desired rather than extended lifetime. The newer models can be more optimized and energy efficient and therefore be more sustainable. Since I am exploring analogue products such as furniture, this dilemma will not be an issue. Prolonging the lifetime of furniture will be a sustainable approach when designing with environmentally sustainable goals. Both van Nes and Cramer and Lilley et al. point out that overall, an extended lifetime is desirable for most products from an environmentally sustainable point of view to reduce environmental impact (van Nes & Cramer 2005, 287 and Lilley et al. 2019, 419).

FIVE DESIGN STRATEGIES:

1. Design for reliability and robustness, not easily broken or damaged

2. Design for repair and maintenance, repairments consumers themselves can manage to accomplish. Keeping costs low, no need for complex and expensive repair systems. Should be as easy as replacing a battery.

3. Design for upgrading, keeping it simple, consumers can perform upgrading themselves at a low cost. Being able to change modules for more advanced ones. Mainly concerning technical products.

4. Design for product attachment, the most uncertain way to prolong products' lifetime. It is difficult to have this personal attachment to all our products, they all can't be our favorites. A tactic that should be carefully applied.

5. Design for variability, offer variation without the need for buying additional parts. Usually this applies to visual aspects.

All of the strategies stated above can be combined in different combinations to influence the product's lifetime.

One of the biggest challenges of creating a long lasting product, according to van Nes and Cramer, is to achieve enduring satisfaction with the product, rather than meeting the brief desires of today (2005, 296-297).

ANTIFRAGILE

Nassim Nicholas Taleb coined the concept of antifragile and it refers to things that become stronger and more resilient as a result of external stressors. The concept was initially applied to the financial industry, where antifragile systems could withstand market volatility and even benefit from its volatility. However this concept can be applied to many other fields.

To understand the concept of antifragile one must understand what fragile is. Something fragile does not enjoy volatility. Something fragile wants calm and predictability and is harmed by disorder. When wanting something that is not fragile the first thought might be that it should be robust. Nassim Taleb states that the opposite of fragile is not robust. The opposite of fragile is something that wants disorders (Taleb 2013, How Things Gains from Disorder, 8:50).

A simple example of antifragility is the muscles in our bodies. When working out or using our muscles, they are exposed to stressors that first break down the fibers in our muscles to then build even stronger and growing bigger muscles. If not using our muscles, exposing them to stressors, they eventually wither away.

DESIGNING WITH ANTIFRAGILE CONCEPT

The first step of approaching antifragility is to be aware of the concept and be aware that robustness is not enough to become antifragile. When designing something antifragile the product is not only durable or resistant to damage, it improves from stressors. This approach is different from traditional product design, which often focuses on creating products that are static and unchanging.

The process of "trial and error" can be an antifragile if you are to learn from your failures. As Nassim Taleb said in his talk at Stanford university 2013: "Don't let a crisis go to waste". He states that from every crisis you should come out stronger than before. A good design process is very much trial and error, learning from failures to prevent future failures that have bigger consequences. Aiming for small mistakes and large gains.

There are ongoing studies to create materials with antifragile properties. NASA is one of many companies that are currently researching the topic. There is a huge need for materials that have antifragile properties within the aerospace industry. Unfortunately, results and progress are classified (Jones, 2014, 870).

YAKISUGI - ANTIFRAGILE METHOD

When searching for antifragile materials I was introduced to a method called Yakisugi. It is a traditional Japanese wood preserving technique where you char the wood's surface which results in increased durability. It is mainly used for house facades but is also used as a preservation method of wooden boats, inside of whiskey barrels and has been seen in experimental furniture.

There are several benefits of charring the wood. It increases the durability and life expectancy. The wood becomes weather resistant which means the UV-rays will not fade the surface and fluctuations in humidity and heat will not affect the wood. When charring the surface, the porous outer layer of the wood closes which makes it flame retardant and water repellent.

Depending on the type of wood and the level of burning the results can look different. It gives the wood a characteristic black matte surface while still letting the pattern of the wood shine through. When using pine, a soft type of wood, the method of yakisugi will extend the lifetime of the pine by making it less vulnerable to wear and tear (Japan Yakisugi, 2021).

THE ANATOMY OF A CHAIR

After a long day the lounge chair is like a hug on your body for a moment of rest. Apart from the bed, we spend many hours sitting in chairs. What makes a good chair or a bad chair is something personal and often felt immediately when sitting down. Depending on your body shape and personal preferences not every chair is for everyone. Yet there are some key factors that can work as a rule of thumb when analyzing a chair (Ramstedt 2022, 31).

The design of a chair must consider a range of ergonomic factors to promote comfort and support for the human body. This includes allowing different seating positions to accommodate the need for alteration and avoiding limiting the user to a static position.

THE SEAT

The seat depth should not be too deep, allowing for the backrest to be reached while allowing the feet to be placed on the floor. Additionally, a soft edge and space at the hollow of the knee, where nerves and blood vessels are located, improve comfort. The seat should not be too narrow, as this would limit the space for the outside of the thighs. If the backrest is tilted, the seat should also be tilted to maintain proper alignment. The seat should also not be too slippery, this could cause the user to slide into uncomfortable positions (Ramstedt 2022, 34-35).

THE BACKREST

The backrest needs to have a slight angle to improve the blood flow, compared to a 90° angle. The chair should not be too high or narrow as this can restrict movement and lead to poor posture. A hollow backrest that does not provide lumbar support can contribute to bad posture resulting in discomfort.

The relationship between the backrest and the seat is also critical, with a backrest angle that allows for a greater than 90° angle at the hips being optimal. The length of the backrest is important as it determines the degree of support. A backrest that is too low will not provide adequate support, while a backrest that is too high can limit head movement and encourage leaning forward. Additionally, a slight horizontal curvature to the backrest can enhance overall comfort compared to a flat design.

It is also important to consider the structure and surface of the backrest, as it impacts the comfort. The lumbar support should be positioned appropriately 17 cm from the seat (Ramstedt 2022, 36-37).

The backside of the chair, including the backside of the backrest, should not be overlooked. This area is the most visible when chairs are either placed by a table or in the middle of a living room (Ramstedt 2022, 41-43).

THE LEGS AND STRETCHERS

The stability and anchoring of a chair to the floor is determined by the type of legs and stretchers used. The placement of stretchers is not only to provide stability but also a crucial part of the design. It is essential to ensure that the stretchers do not interfere with different sitting positions or limit movements, such as standing up or sitting down. Additionally, slightly angled legs can make the chair sturdier and reduce the risk of tipping from forces applied on the sides. If the chair has an angled backrest, the back legs should also be angled to help balance out the weight. The presence of angled legs may also indicate that the chair is stackable. Moreover, the stability of a chair is determined by how the backrest, seating and legs are joined together. These joineries are exposed to the most load and stress when in use (Ramstedt 2022, 38-39).

By taking into account these various ergonomic factors, it is possible to create a chair that promotes optimal comfort and support for the human body.

THE WEAK SPOTS OF A CHAIR

To ensure the longevity of a chair it is important to identify the weak spots. The top of the backrest is a common weak spot as it is where users often grab onto when moving the chair. If the top of the backrest is not easy to grip, users may grab onto the side of the backrest, potentially causing damage to the material. Similarly, the front legs of the chair are more prone to wear when moved by the backrest. In addition, metal screws may not follow the natural movements of a wooden chair and may require re-tightening. However, it is crucial that metal screws are tightened properly. As loose screws can create wear and damage the wood, which is another important consideration when designing a chair (Ramstedt 2022, 45).

SUMMARIZED GUIDELINES:

- Slight curved seat and backrest
- Lumbar support, located around 170 mm from the seat
- Not too deep or too narrow, around 570-600 mm
- Non slippery surface
- Soft edges at the hollows of the knee
- Stretchers should not interfere with legs or feet
- Allow for different seating positions
- More than 90° angle between seat and backrest
- Not too high or too low seat, around 420-450 mm seat height
- 60° free space beneath the chair to allow room for legs and feet
- Armrest positioned around 250 mm from the seat

WORKSHOP MARCH 6TH

Workshop participants:
Gabrielė Žilinskaitė, Arati Dhakal, Luisa Wirth, Védís Pálsdóttir

Together with four classmates of different backgrounds and broad design specialties, a "6-3-5 Brainwriting" workshop was carried out. After presenting my project and a brief discussion each one of us had 2 minutes to write or sketch all their ideas on paper. It resulted in numerous ideas and topics to be further investigated in less than 30 minutes.

FROM THE WORKSHOP IT WAS POSSIBLE TO SEE A FEW COMMON TOPICS, PRESENTED SUMMARIZED BELOW:

- "DIY" & "Personalize": the consumer actively changes or alters the appearance of the chair like carving, paint etc.
- "Multifunction": the chair has more functions than only providing a place to rest: storage, rotating to get new functions, armrest as a table etc.
- "Tactile points" & "Action signifier": areas of the chair that were stated to have a lot of interactions were the backrest, armrest and textured surfaces here were of interest.
- "Enhance patina": soft wood might give clear apparent signs of scratching, depending on placement in the house the chair is exposed to different environments and the patina therefore differentiates.

The workshop gave me numerous new perspectives of a lounge chair and its usage I continued to work with. When discussing tactile areas of the chair, lead us to discuss how the chair is being moved. The lounge chair is not typically moved around as much as a dining chair. Therefore, the moving of the chair is not a concern. Although, tactility and adjusting the chair is still of importance. I continued with investigating topics of multifunctionality of the chair, tactility and possibilities of enhancing patina.

PRICING

According to Sommar and Helgesson (2012, 111-112) the pricing of what we buy has a huge impact on how we consume. Our escalating consuming habits, that have been shaped during the last four decades, are not sustainable. The cheap prices make it possible to consume and toss away at a very fast pace. Sommar and Helgeson believe that price is something that should be divided over the product's lifetime. Buying expensive that will last a lifetime is in the long run cheaper than something cheap that only lasts for a few uses. Something with a high price can be priceworty and non expensive. According to Nirvan Richter, founder of Norrgavel, very cheap often means that somebody else has to pay, which often means the third world (Sommar & Helgesson 2012, 111).

Our reward system is one of our most primitive needs and is triggered by the constant desire to make a good deal. This desire is not uncommon and is comparable to addiction. Predrag Petrovic, researcher of cognitive neuroscience at Karolinska Institutet, claims that we are not made for today's society (Sommar & Helgesson 2012, 111-115).

Pricing has a big impact on both how we treat and consume products. According to Maria Benktzon, professor in Industrial design, argues that more expensive products require reflection and a thorough reflection before purchasing whereas cheaper products encourage wasteful behavior (Sommar & Helgesson 2012, 171-185).

During the Danish Design Days in October 2021 Hermés generously opened up and shared their knowledge of craftsmanship of producing high quality products. In the house of Hermés, creating long lasting products has always been essential when creating objects. The definition of a luxury product according to Guillaume de Seynes, executive vice-president of Hermès, "A luxury object is something you can repair, give a second life and pass to the next generation." Which I am willing to disagree with.

DISCUSSION & CONCLUSION

On the contrary to Hermès, I believe that an object you can repair, give a second life or pass on to the next generation, does not need to be a luxury object. Although, most of today's objects are not possible to repair or renovate due to the poor construction and material selection. It is not uncommon that it is cheaper to buy new than to repair. The ability to repair and refurbish has to do with materials and construction. With a thought through design this is possible to accomplish without having a product being in the high end luxury section.

Antifragile can be incorporated into the field of design in many ways. Initially I aimed for natural antifragile materials which were found yet not suitable for furniture. I then focused on an antifragile design process and an antifragile wood preserving method, yakisugi. An antifragile design process is about fast failures to gain knowledge in early design stages. Therefore the impact of the losses are low and gains are high. Making failed projects are not looked upon as great projects. But we need failed projects for the system to learn and develop new knowledge.

The main challenge with antifragile is that the concept mainly applies to living matter or moldable systems. Both these have the ability to adapt and change from stressors, yet this is not something a piece of furniture can do. When making furniture in wood it is commonly known that "wood is a living material". Humidity or heat can make things expand, shrink, move and warp. Yet, it is not a living material in terms that it can grow out new legs if broken off.

When applying an antifragile mindset to furniture design one would involve creating pieces that are not just robust or resistant to damage, but actually thrive under pressure and become better over time. By this I am creating with patina in mind, something that gets better with age, using materials and intended users in environments that patina requires to thrive. I am also claiming the wood preserving method, yakisugi, as antifragile. The wood is exposed to extreme heat stressors and results in an increase in properties instead of being destroyed.

It is worth highlighting that "Antifragile" is primarily a book about philosophy and systems thinking, rather than a practical guide to product design. Although, Taleb's insights and ideas can certainly be applied to product design.

It is a fine line when distinguishing patina and degradation. Yet there are some rules of thumb to guide when designing with patina in mind. The intended user or users are of high importance to consider when creating a product that allows patination. Shared objects and synthetic materials are often viewed negatively, as degradation, compared to personal objects made of natural materials. Therefore I am moving forward with personal use of wood furniture at home.

When investigating the topic of aging, patina and long lasting furniture the mindset of taming the uncontrollable came to my mind. The constant work against the natural ways of aging is a losing battle in my perception. With the enhancement and encouragement of patina it is possible to work with it instead of against it. It is an antifragile mindset when it comes to working with the setbacks instead of against.

Creating long lasting products is challenging and can be aimed for in many ways. A long lasting product should be well functioning, up to date, age well and meet altering needs. The main challenge of creating a long lasting product is to achieve enduring satisfaction with the product, rather than meeting the brief desires of today. Van Nes and Cramer's five different design strategies or design for encouraging passing on furniture can be ways to influence a longer lasting product.

Material selection matters in many ways when designing furniture. It has a huge impact on how it will age, how it will be perceived when aged, the CO_2 emission imprint, only to name a few aspects. Using natural materials such as pine will allow for patination as well as it has a low environmental impact. The aging of pine is well known and will not come as a surprise to the consumer.

SUMMARY OF THE MAIN TAKEAWAYS:

- Patina enhancement and material selection: using natural material such as wood and untreated metals, such as brass or copper, will age gracefully
- Design for variability: solid materials that allow refurbishing, painting and restoring to original look, non-treated metals can oxidize and then be polished again.
- Easy to maintain and repair: solid wood without textiles makes it easy to clean
- Performance: a main focus on use, comfort, reliability and robustness
- Antifragile thinking: hands-on approach with aiming to fail fast in early stages

DISMISSED MATERIALS

LEATHER:
Leather is a natural material that has great potential in patination. And is a material that is often referred to when reading about patina. Yet the CO_2 emissions are very large compared to pine wood.

PAPER BRAIDS:
Paper braids are a sustainable material although they have a shorter lifespan and harder to maintain, once broken the whole thing can come off. It is also a more difficult and expensive craftsmanship to get renewed or get repaired.

TEXTILES AND STUFFING:
Textiles are more fragile to wear and tear and same as paper braids, they are difficult and expensive to repair and maintain.

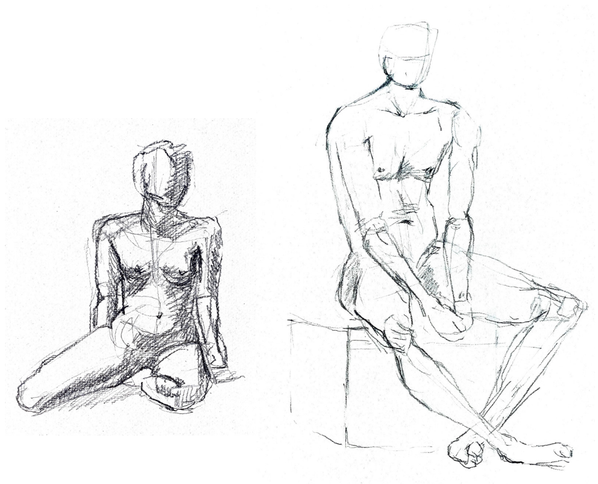
"A CHAIR IS A VERY DIFFICULT OBJECT.
A SKYSCRAPER IS ALMOST EASIER."
Ludwig Mies van der Rohe

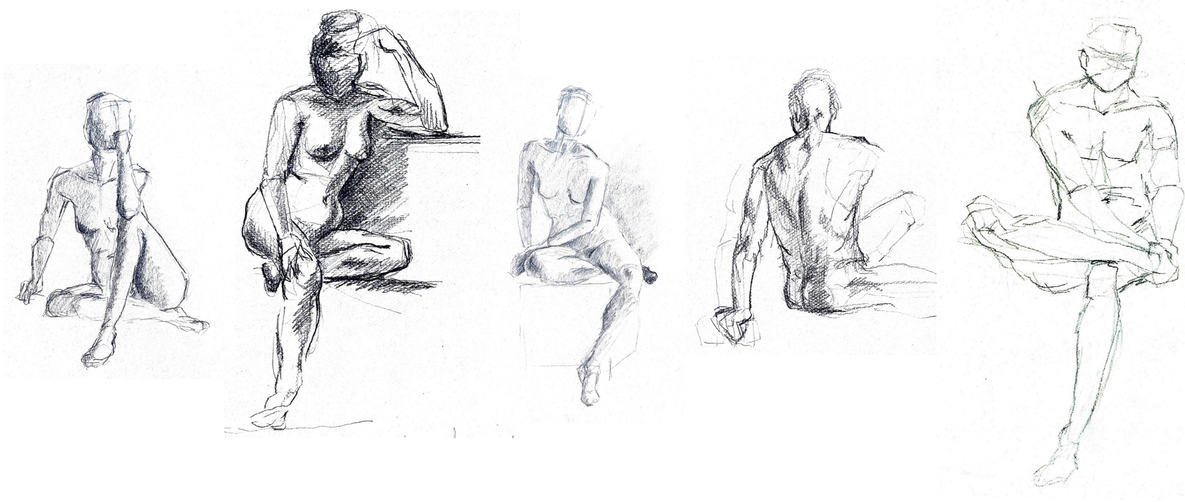
SYNTHESIS

DESIGN PROCESS

With a foundation of research, I moved forward with stating a framework, consisting of a function analysis, target group, persona and mood boards with keywords to then continue with an experimental design process consisting of numerous prototypes. Guiding me in both constructional aspects as well as creating a visual form language.

To infuse the design process with creativity and joy, I ventured beyond the traditional realm of design for inspiration. Exploring croquis as a method to explore the interaction between chairs and the human body, I delved into the diverse seating positions and complexities of providing comfort. Surprisingly, what may initially seem comfortable can quickly turn uncomfortable after just a few minutes. Croquis models, with their expertise in understanding body dynamics, excel in what poses prompt shifts in posture. Creating comfort requires considering the duration of the intended sitting and the chair's ability to accommodate changes in position.





TARGET GROUP

The target group are individuals with a passion for interior design and are willing to invest in furniture and prioritizes quality. They have an eco-conscious mindset favoring locally produced goods. Primarily living in Scandinavia and aged between 30 to 45. They have a limited interest in keeping up with design trends, preferring enduring choices over fleeting fads.

PERSONA: ROMAN

Roman is an individual with a busy lifestyle who values the opportunity to disconnect from technology and indulge in reading. He cherishes the small moments in life and possesses an interest in classic interior design of good quality with a sustainable approach. He enjoys taking care of his belongings and his creative trait shines through when restoring, repairing or refurbishing at home. Roman loves taking on new projects and has a carefree approach to life at the same time being considerate of making good decisions.

Sitting jargon:
- Brief
- Relaxed
- Moderate comfort to prevent sitting too long
- Combines a break with something to drink or small to eat

FUNCTION ANALYSIS

Verb	Noun	Main Function, Need or Desire
Enable	Sitting	MF
Support	Lombard	N
Provide	Rest	N
Enable	Restoring	N
Enable	Repairing	N
Support	Arms	D
Be	Antifragile	D
Support	Patination	D
Feel	Hugging	D
Provide	Sideboard	D

FOREVER INSPIRATION

The inspiration that is always with me throughout my works is nature. I will always be fascinated by the beauty and the intelligence, therefore I decided to call it forever inspiration. Water movements and light reflections are two phenomena that highlight this fascination of nature. In addition to my own admiration for nature there are numerous studies of how nature has a positive impact on our wellbeing. Biomimicry and biophilic designs are highly studied areas and bring the man made world closer to nature. This I believe is an important aspect when designing for a world I want to live in.

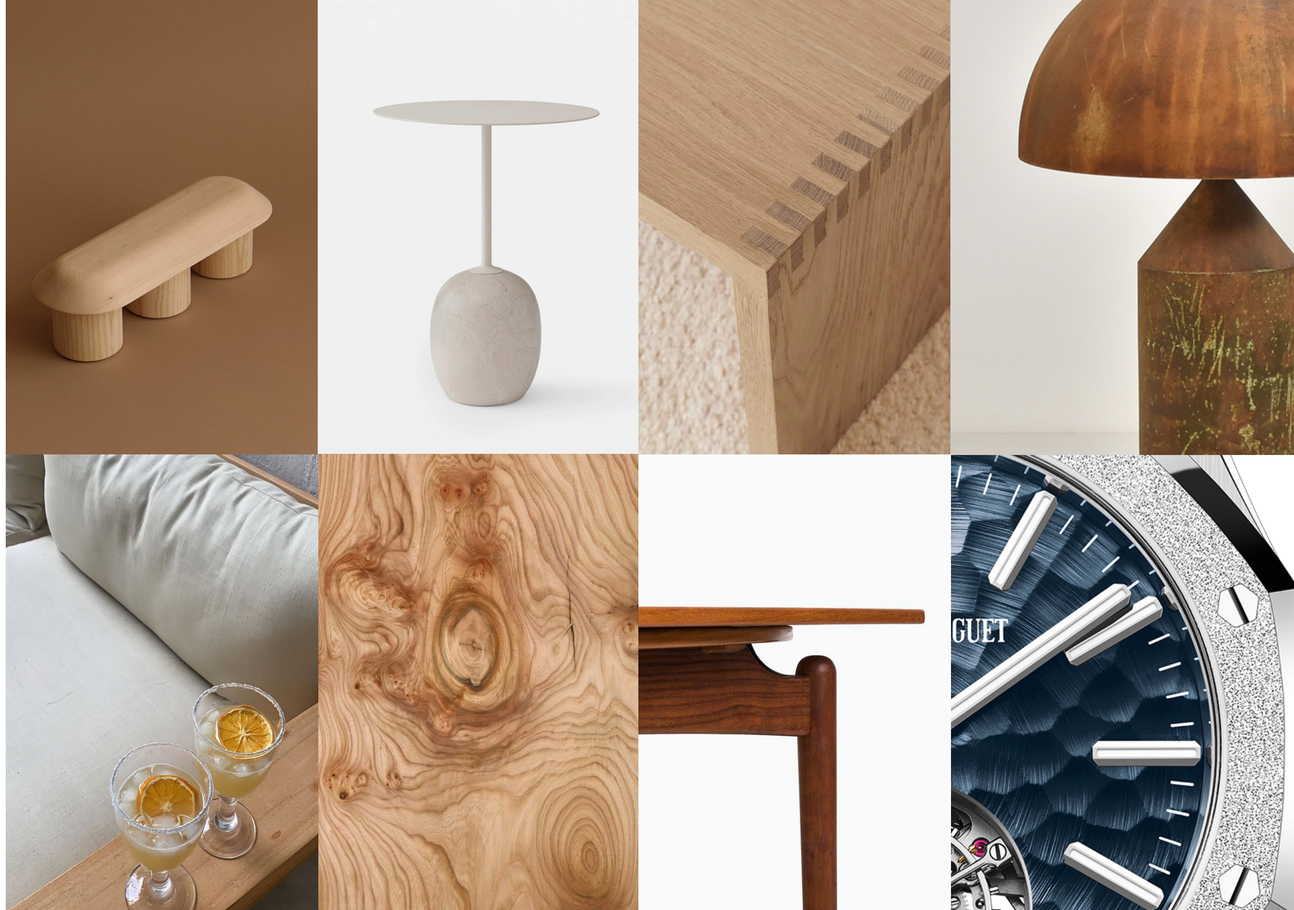
In addition to my forever inspiration, I created a mood board, limitations and keywords based on the findings in the literature study. Presented on the next page.

LIMITATIONS:

- INDOORS
- HOME
- PINEWOOD
- BRASS DETAILS
- EASY MAINTENANCE
- COMFORT
- VARIABILITY
- ENDURANCE
- RELIABILITY AND ROBUSTNESS

KEY WORDS:

- VISIBLE JOINERY
- SOFT
- DURABLE
- STURDY
- SOFT TRANSITIONS
- TACTILE
- FLOATING
- SOLID
- ALLOW PATINATION



PROTOTYPE NO 1

- TESTING MEASUREMENTS & ANGLES FOUND FROM RESEARCH

Using MDF and wood scraps from the workshop I crafted mockups to test my knowledge and research. The first prototype assessed both angles and heights of the seat and backrest. Classmates and teachers of varying sizes provided feedback on comfort. Based on the measurements of the first, a second prototype was made. The final measurements of the maximum comfort of angles, heights and surface area was accomplished. Moving over to foam I then sculpted the final design, creating a 1:1 model.

PROTOTYPE NO 2 - FINALIZING MEASUREMENTS & ANGLES

Allow for different sitting positions

Not too deep or too narrow seat

Not too high or too low backrest

Non slippery surface to prevent sliding

Allow room for legs and feet under chair

Soft edge where the seat meets hollow of the knee

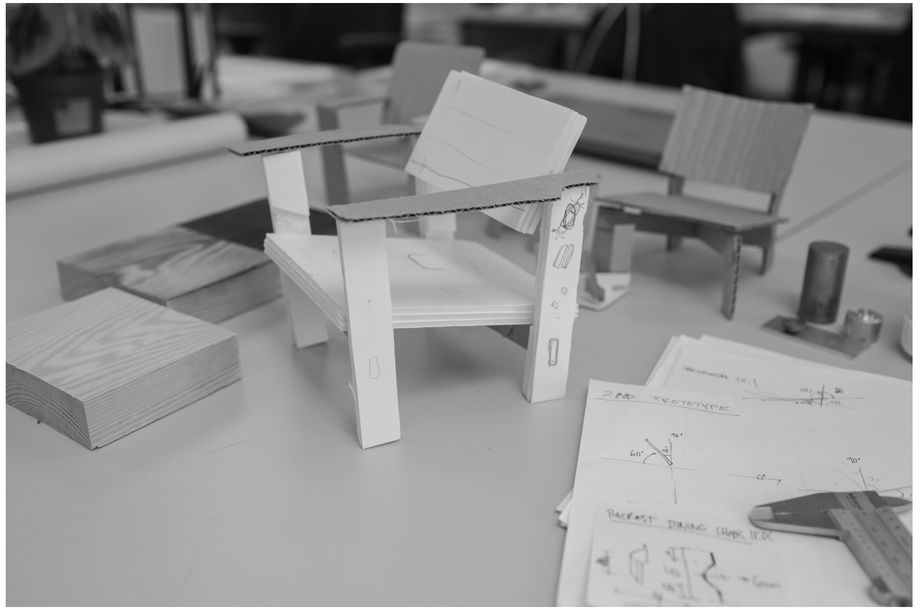
+/- 170mm space between seat and backrest

More than 90° angle between the seat and backrest

Slight curve to seat and backrest

Not too high seat, allow feet to touch the floor

COMMUNICATION PROTOTYPE - COMMUNICATING IDEAS AND DESIGN TO SUPERVISORS AND WORKSHOP STAFF



PARALLEL TO PROTOTYPING - QUICK SKETCHING AND 3D MODELING

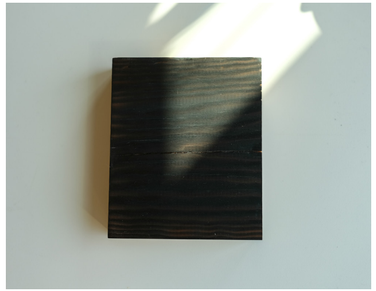
Final design

YAKISUGI - WOOD CHARRING

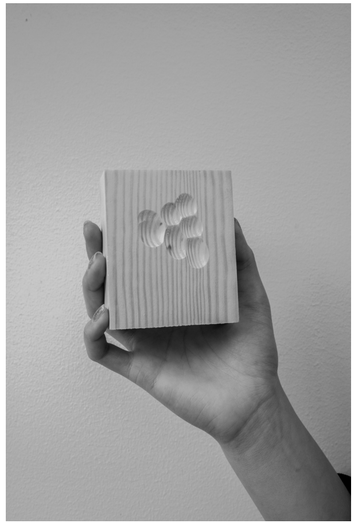
The method was tried out on several different types of wood found in the scraps of the wood workshop. Pine wood resulted in giving the most interesting and seamless results.

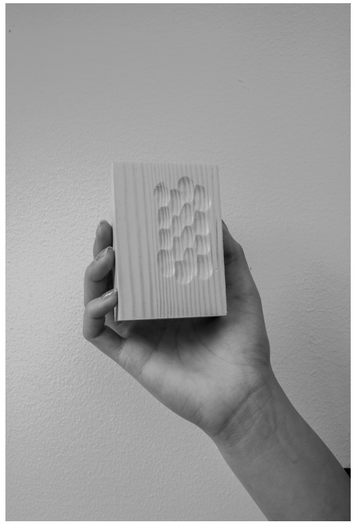
NATURAL

CHARRED



CHARCOAL



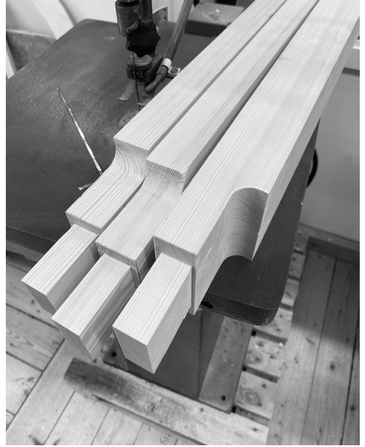


MILLING A STRUCTURE

Tactility was in numerous ways explored with different carving techniques, both by hand and machines. The aim for incorporating a tactile element was the possible time signifier. With a tactile structure, encouraging touch, the clean cuts of the carvings of a new chair would eventually turn dull. Resulting in a smoother tactile experience when aged.

PROTOTYPE NO 3 - APPLYING CHOSEN MEASUREMENTS & ANGLES FROM PROTOTYPE 2 AND SCULPTING FINAL DESIGN

REALIZATION



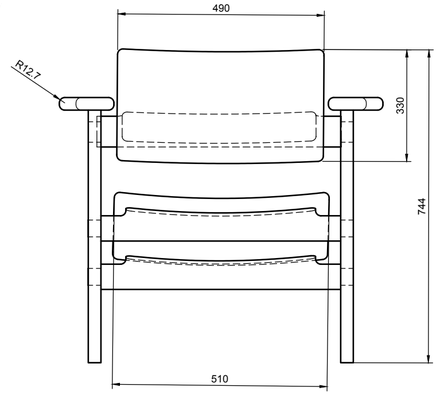



The finalization of the chair required a timeframe of four weeks for completion. The profiles of all the components were identical or highly similar, facilitating a streamlined and quick production process. The preparations such as laser cutting templates and practicing, accounted for the majority of the time in the manufacturing process. It is worth mentioning that if a second chair were to be constructed, the overall building duration would be significantly reduced.

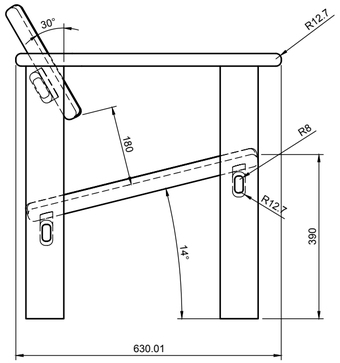
FINAL MEASUREMENTS

The technical drawing on the following page displays the final measurements of the chair. It comes fully assembled, guaranteeing optimal performance and quality. With a weight capacity of 100 kg, the chair accommodates various users. The armrests are designed to support half the weight capacity of the seat.

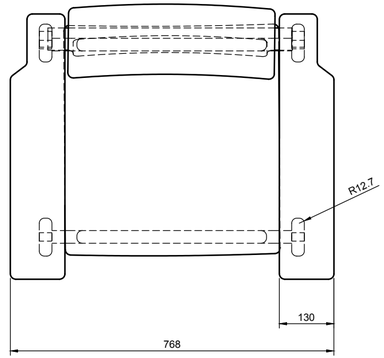
FRONT VIEW



SIDE VIEW



TOP VIEW



FINAL RESULT

BLOOM

The final result is a soft and smooth wooden lounge chair. It provides ergonomic comfort and good support for various resting positions. The solid wood with generous thickness and traditional wood joinery provides a robust, sturdy and reliable chair. Yet, light enough to be moved around for refurbishing. The thickness allows for numerous possibilities of variation, such as painting, staining or sanding back to the original finish. The profiles of the legs are anchoring the chair to the floor and there is no risk of the chair tipping over. The wide armrests can be used as a small sideboard for a coffee, book or snacks. The function adds a new interaction with the chair as well as it aids in getting up and sitting down in the chair's relaxed position.

The rounded edges make the soft pine less vulnerable to dents which allows it age gracefully. The unique pattern of the wood comes from when it is cut alongside the fibers and is referred to the "flower side", hence the chair's name BLOOM. The variation in color and structure of the wood avoids the "lack of newness" with wear and tear allowing for natural aging and patination. It is cooperating with time, being antifragile to aging, aiming for it to look even better with time. With few ornaments making it a timeless aesthetic and being fully functional without relying on other products to function, the chair is well suited for being passed on for future generations. The well known materials' aged look is predictable and brings both warmth in touch and color to the home it is placed in. The finish is natural matte oil, giving an honest result to the natural color of the wood and keeps it easy to maintain.

Pine is very well suited for the Scandinavian climate, where my target group is positioned, and will not crack, warp or dry out under natural circumstances. Using only wood makes it both easy and cheap to clean, maintain and repair. With it being placed in a home environment for personal use, the wear and aging is likely to be perceived positively. Wear and aging is often associated with memories and personal continuous use.

The fibers are following the length of each piece and placed with the forces eliminating each other out, for ultimate constructional performance. The screws in the seat allow the natural movements of the wood. The seat is the most exposed area to wear and tear which the screws make for easy repair and/or replacement.

The chair comes in three different variations, natural with oil finish and two variations of the wood preserving technique of yakisugi. The chair will be an investment yet not a luxury furniture. The material costs are low, simple profiles and with only a few detailing in the joinery the pricing can be reasonable. The chair is an investment although, with the pricing divided on the lifetime expectancy the chair can be considered affordable.

NATURAL

CHARRED

CHARCOAL

BLOOM.

Long lasting furniture created today - designed for tomorrow

Klara Blomsterberg

EVALUATION

REFLECTION

One of the biggest challenges of this project have been the compromises and adjustments. The topics of antifragile and patina were sometimes conflicting. Some of the ideas I had to discard and I eventually had to “kill my darlings”. For the final chair I decided to not char the wood. Numerous tries were done yet achieving a seamless charring was challenging, especially on larger surfaces, due to the torch and weather conditions.

Using pine wood when hand carving or machine powered carving was a challenge, primarily due to the wood’s softness and uneven hardness, resulting in a non clean cut. Numerous attempts were made, yet the result did not meet my expectations. The appearance did not align with the overall aesthetic and was not in line with the goal of achieving a timeless design. Therefore the tactile element was eliminated.

Using brass details or mountings did not make sense in my design. The possible ways were discussed with the wood workshop instructors. I decided that the impact and usefulness of incorporating metal was not significant. Both metal details and woodcarving would add another step to the process, which would increase the price.

As a conclusion, I am content with the outcome of the project. I have learned a lot and gained experience in decision making, prototyping, time management, new software and designing and building furniture in wood. The experience of furniture making has been positive and an area I am happy to continue exploring.

FUTURE STUDIES

There are numerous interesting topics to continue exploring for further research. The development of antifragile materials is an optimal way to go when developing for future needs and situations, not only within the furniture industry.

The future of the final design has potential in continuing as an outdoor series, using the traditional way of yakisugi as a preserving method. The black matte charcoal finish is optimal for outdoor climate as well as it gives strong characteristics to an outdoor piece.

THANKS TO:

MY FAMILY

JASJIT SINGH
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CLASSMATES OF MID 2
NORRGAVEL IN MALMÖ

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Klara Blomsterberg

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