



KONSTANTEN

Olivia Johnsson



LUND
UNIVERSITY



KONSTANTEN

Degree project for Fine Arts in Design, Main Field of Study Industrial Design,
from Lund University, School of Industrial Design

Department of Design Sciences

Examiner:

Professor Claus-Christian Eckhardt

Supervisors:

Professor Claus-Christian Eckhardt, Lecturer Anna Persson,
Senior Lecturer Jasjit Singh, Senior Lecturer Charlotte Sjödel

Olivia Johnsson

Copyright © 2022

ISRN: LUT-DVIDE/EX--22/50576-SE



LUND
UNIVERSITY

ACKNOWLEDGEMENTS

Special thanks to **Charlotte Sjödel** for being a great main supervisor during the whole project, mentoring me when I struggled and giving me confidence.

A BIG thank you to the **workshop staff** that has acted as a specialist team when discussing the project and possible improvements and solutions. Especially thank you to **Bert**, for being a true rock and a welding genius – a true professional.

ABSTRAKT

svenska/swedish

Formgivare och tillverkare har stora möjligheter att påverka konsumentens beteende – något som är ett nödvändigt steg mot en mindre slösande livsstil. Jag ser ett behov av ett produktexempel som förmedlar att behålla istället för att byta ut.

En omfattande research har gjorts med fokus på psykologin bakom att behålla. Detta, i kombination med egna reflektioner om hur framtidens design skulle kunna se ut, har gjorts för att skapa en tydligare bild av ett formspråk som har potential att inte gå ur tiden. Fullskaliga prototyper och regelbundna utvärderingar med hjälp av verkstadspersonal har möjliggjort att fort analysera vad som fungerat och inte.

Resultatet kallas KONSTANTEN – en semi-hopfällbar balkongstol som kan massproduceras på en grund av cirkulär ekonomi, samt med ett unikt inslag i varje individuell stol. Formspråket kommunicerar ärlighet och belåtenhet med funktionen i fokus.

Projektet KONSTANTEN ger exempel på olika verktyg som formgivare och tillverkare kan använda för att få en produkt att kommunicera ett personligt värde för konsumenten – vilket i sin tur kan leda till att konsumenter väljer att behålla en produkt istället för att byta ut den. Den är ett exempel på hur ärlighet och transparens i produktion och funktion kan skapa något vackert – något som kan appliceras på andra produkter och produktionsprocesser i framtiden.

ABSTRACT

engelska/english

There are many opportunities for designers and manufacturers to change consumer behaviour – an important and necessary step towards a less wasteful way of living. I see a need for an example product which could empathise *keeping* instead of *changing*.

An extensive deep-dive into the psychology surrounding the subject *keeping* was conducted. This, in combination with own reflections on how future design values could look like, was done to create a clear vision of a design language that has the potential to become timeless. Full scale prototyping and regular evaluations with the help of workshop professionals made it possible to quickly get a sense of what's working and what's not.

The result is called KONSTANTEN – a semi-foldable balcony chair that can be mass produced on a foundation of circular economy with an individual detail on each chair. The form language communicates honesty and satisfaction with the folding function in focus.

KONSTANTEN shows different tools designers and manufacturers can use to increase personal felt value in a product, which can lead to consumers keeping their products for a long period of time. It's an example of how transparency and honesty in production and function can create something satisfying - and something that can be translated into other products and other production processes.



TIME PLAN

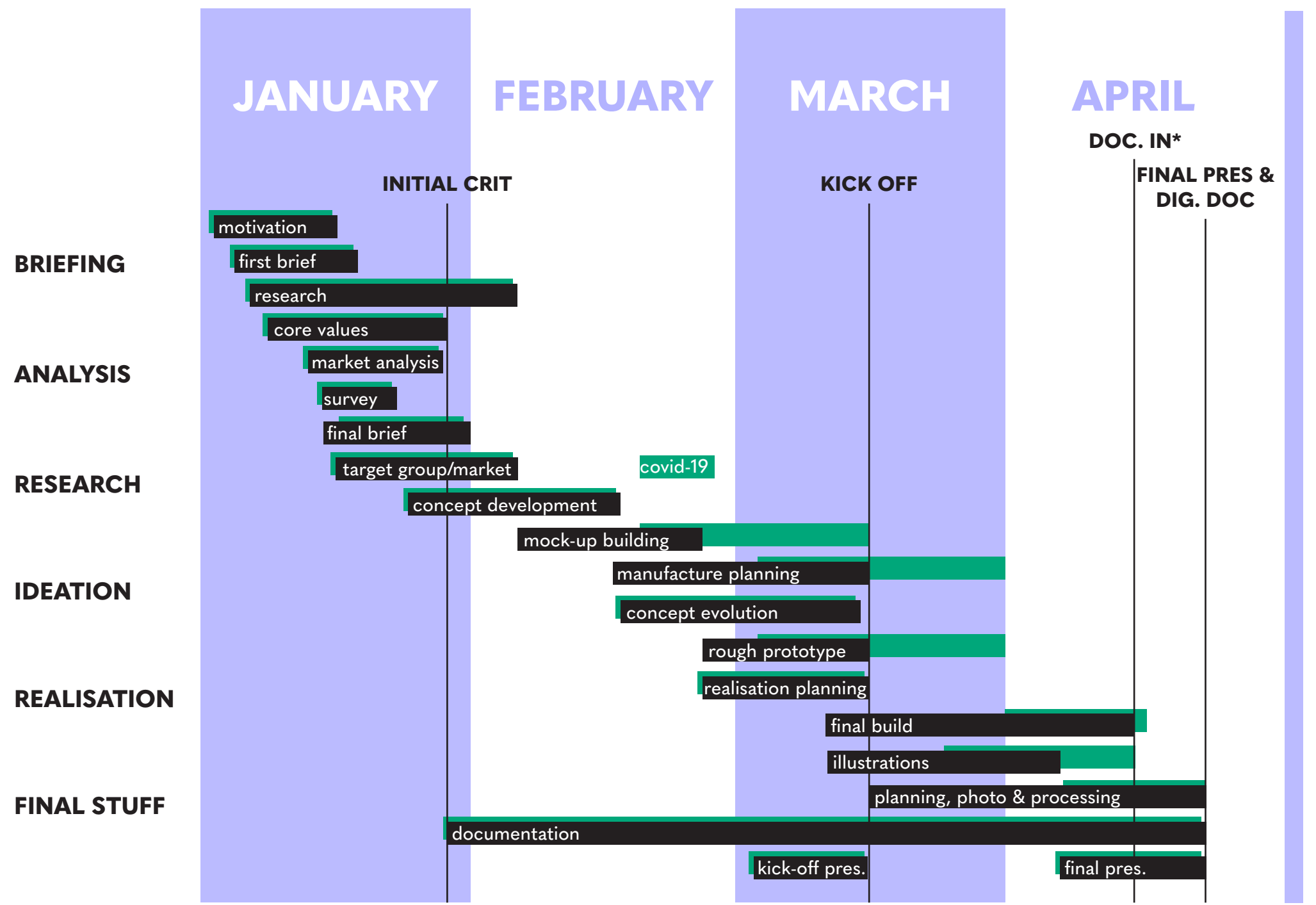


Original time plan



Actual time spent

**short of final pictures etc.*





FUNCTIONAL

10 MOTIVATION

12 Sustainability?

14 ANALYSIS

16 What creates value?
18 Outdoor furniture
19 First brief
20 Living situations
22 Market analysis
24 Measurements
28 Attributes
31 Final brief
32 Function analysis
34 Target consumer

36 IDEATION

38 Concepts
42 Mounting
44 Prototyping
46 Form evolution
48 CMF strategy
50 Feet
52 Stamping fonts

54 REALISATION

56 Technical drawing
60 Final build

62 RESULT

70 Circular plan
74 Evaluation

76 APPENDIX

78 Full survey
80 Price calculations
82 Sources



FURNITURE, *but why?*

This project began with the urge of creating something bigger for my portfolio. I also wanted to create a product that was known to most people – to be able to illustrate the complexity of circular economy and the psychology behind *keeping*.

Everything from material selection, manufacturing method, marketing and form greatly affects the final product and how it is perceived and used. My interest of furniture design comes from the complexity of intention – How can we create another chair without *just creating another chair*?

I think that circular economy, design for disassembly and a conscious manufacturing process should be the stepping stone of most design projects. In this project, I would also like to investigate how to encourage the consumer to *keep*, rather than discard. **How do we create value in a product?**

SUSTAINABILITY?

Sustainability is often divided into three main sectors – environment, economy and society. Sustainability regarding design often touches upon environment and society the most. From my research in the subject, I came across a trend report from DesignWanted, stating that “[We are] longing for more meaning and not more stuff”. Consequently, I asked myself the normal follow-up questions, such as “How can I create a product, without creating a product?”. After discussing what causes meaning in general, I came to the conclusion that the value of a product plays a big part when it comes to consumption (or non-consumption). (designwanted.com, 2020)

From my research upon the economical part of sustainability, I focused on circular economy. Circular economy (apart from linear economy) is the cyclic thinking and organisation of product flows (or flows in general) in a company or organisation. This creates a less wasteful system. I realised the importance of circularity, the crucial strive for innovation and the need of communicating circular economy to the consumers in a clear and transparent way. (Ellen MacArthur, 2022)

All of this made it clear that this project would have two deliverables – one being a product created on the basics of circularity (or an example product of some sort) and the other one being a circular economy plan to communicate circularity in an intuitive way to the consumers.

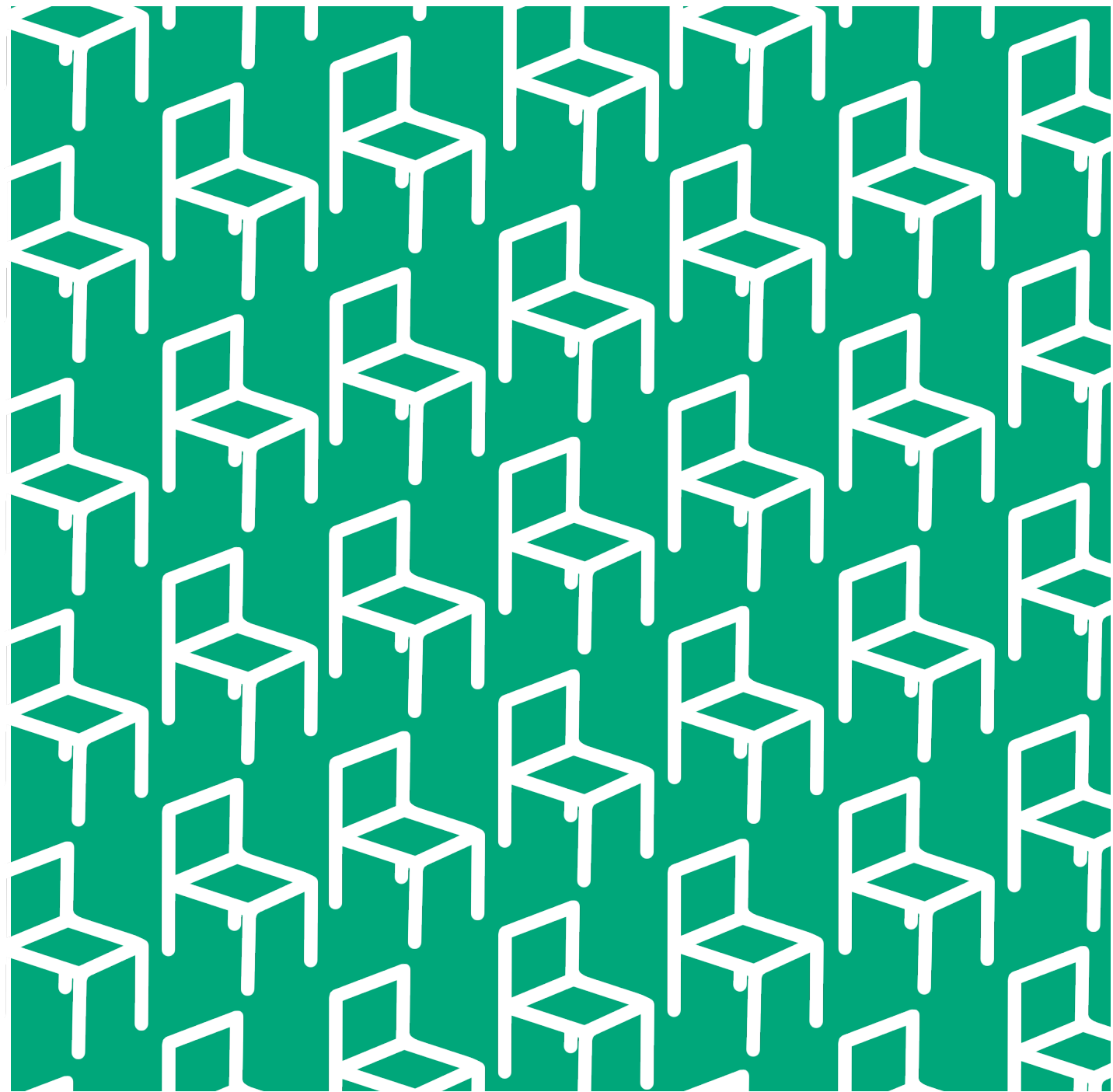
“[We are] longing for more meaning and not more stuff”

How can I make a piece of furniture without creating “more stuff”?

CREATE VALUE



ANALYSIS



WHAT CREATES *VALUE*?

Or rather: What makes a product meaningful?

We as humans tend to build relationships with certain items. What makes us create this bond and what increases the chance for us to create these bonds? After open discussions and sources to verify, I've pinned down some of the attributes that makes us bond with products.

Nostalgia – Nostalgia is the feeling you get when you experience something that makes you think back and remember an old and hopefully pleasant situation, e.g. when you're coming home to your parents' place and they're cooking a dish from your childhood and the smell makes you think back on a nice memory. It can also be when you're taking out the outdoor furniture and get the feeling that summer is coming, or when you're cleaning a table and are struck by the memory of a big party you had 4 years ago where you met two of your (now) best friends during a round of beer-pong on that very table. The power of nostalgia is pinpointed in the study *Product attachment and replacement: implications for sustainable design*, where Tom Page comes to the conclusion that nostalgia is the most eminent cause for long term product attachment. (T. Page, 2014)

Time – For nostalgia to pass please on what is the most prominent cause for attachment to a product, time needs to be added to the equation. The longer you have a product

the more prone to nostalgia it will be - and has a bigger chance of creating a value. To be able to withstand time, the product needs to age well and not break. (T. Page, 2014)

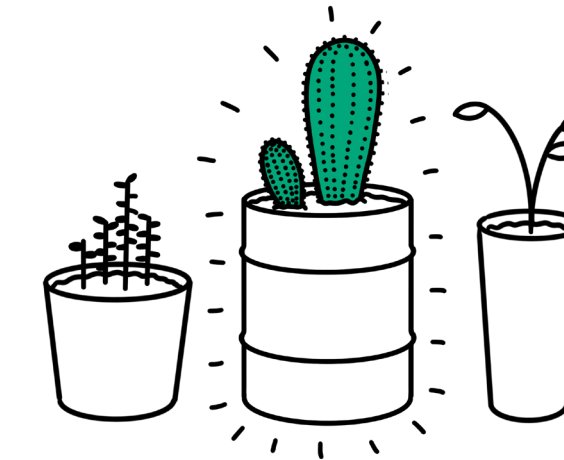
Uniqueness – On an individual level, *The Significance of Being Unique* by Earl C Kelley brings up that humans want to be unique because this assures them a special place in their own society. I think that the strive for individuality and uniqueness projects onto products we surround ourselves with - so we can build *our own special society of products*. If a product is unique (e.g. a hand crafted drinking glass or a bakery made birthday cake) it seems to create a feeling of value. "This is my bowl, and I can see it because...". (E C. Kelley, 1957)

Hardship – Money and availability are among the things that could make a product hard to get. Hardship, or struggle, can often be sprung from setting certain goals, e.g. to pass an exam or to be able to afford the sofa you want. If you need to put in some work to be able to get the product, it can also increase the value of the product for you. In the article *Importance of Goal Setting*, Eli Straw describes the individual importance of goals and how striving helps us feel good, motivated and grow as humans. (E. Straw, 2022)

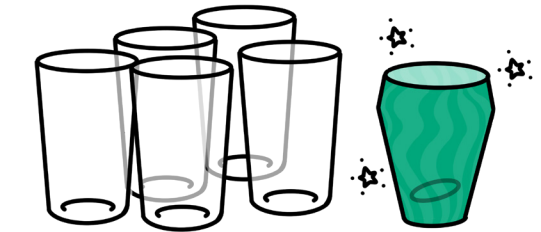
I didn't work further with *hardship*, because while the three other attributes has a positive undertone, hardship describes more of a struggle.



NOSTALGIA



TIME



UNIQUENESS

OUTDOOR FURNITURE

When it comes to what piece of furniture I chose to work with, I selected a seasonal piece because in my opinion, it's easier to keep something that you don't see all the time and it's easier to form memories with those kinds of pieces. After choosing between festival chairs (brassestolar) and outdoor furniture, I chose outdoor furniture since they are more often visible compared to festival chairs. You also have bigger freedom, since they can have more than one purpose, while festival chairs restricts you to the *portable lounge posture*.

I decided to make some kind of sitting furniture, with the main reason being that the chair comes first. You seldom see an outdoor space with a table and no chairs, but it's quite common that you see a chair or a sofa without a table.



FIRST BRIEF

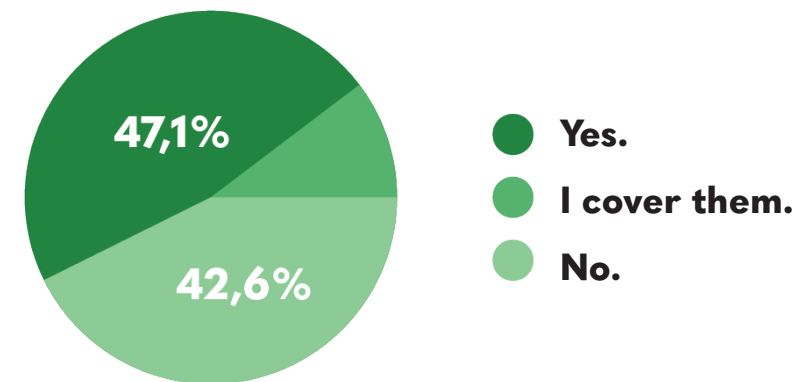
How might we create a piece of **OUTDOOR SITTING FURNITURE** that have such a **VALUE** that the owner lets it be around long enough to become **MEANINGFUL**?

LIVING SITUATIONS TODAY

A survey was conducted to answer simple questions, such as living situation, relation to outdoor furniture and frequency of use. For full survey, see *Appendix*.

From the 166 answers, 48.8% are living in apartments (country average 42%), 39,2% in houses. Out of the people **living in apartments** with outdoor spaces, **96% have or will buy outdoor furniture** (80% already have and 16% will buy). **~50% use them very often or daily** and **over 50% have them outside all year around.**

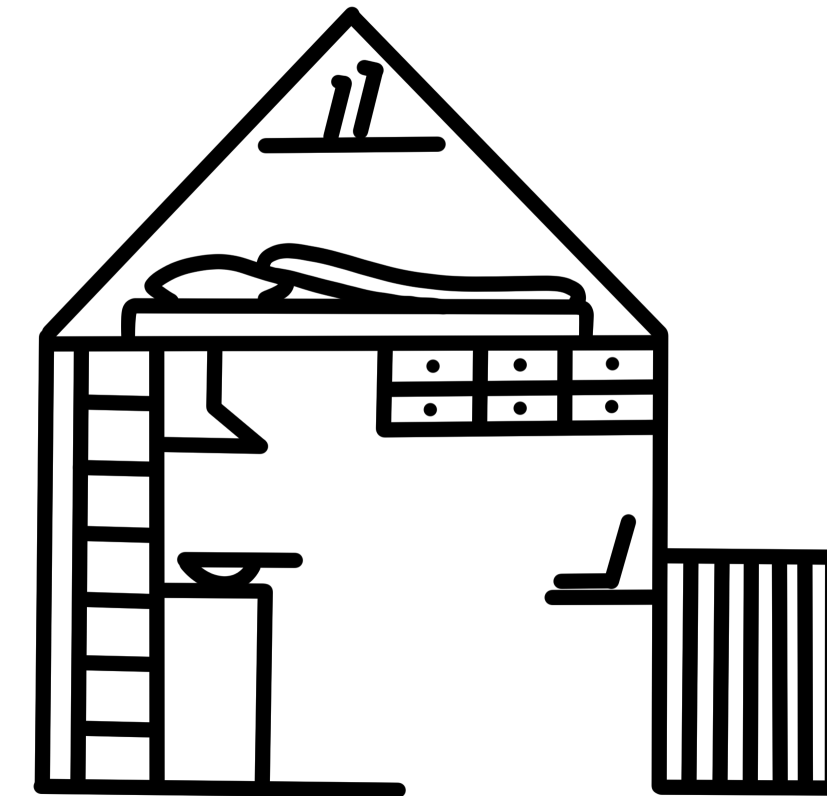
Do you bring your outdoor furniture indoors during winter?



LIVING SITUATIONS TOMORROW

Compact living is a global trend, but also something that many see as a necessity for a greener lifestyle. By living small, you decrease the amount of energy needed to heat up your living space (in Sweden approx.80% of a house's energy go towards heating and hot water). A small space living situation will also help people to live more effective and be conscious about furniture and things for the home to not feel cluttered which is also a big plus. (vattenfall.se) (E. Jeanette)

A small living space comes with a small (if any) outdoor area, such as a balcony. To fit the living situations of tomorrow, the piece of outdoor sitting furniture should fit in the space of a small to regular sized balcony.



HERE!



Hillerstorp torpet,
~ 1399 kr



Grythyttan A2,
~ 3000 kr



Eden Wood Holmsund,
~ 2250 kr



Pall, ~
600 kr



Fiori, ~ 1300 kr
for a set of two +
table



Trademax hopfällbar,
~ 650 kr



Biltema caféstol,
~ 149 kr



Biltema Plaststol,
~ 149 kr



Acapulco, ~ 1500
kr for a set of two



Gudhjem,
~ 599 kr



Roma karmstol,
~ 1990 kr

Out1 loungeset, ~
650 kr

ABILITY TO REPLACE PARTS

SIZE (footprint)

MARKET ANALYSIS

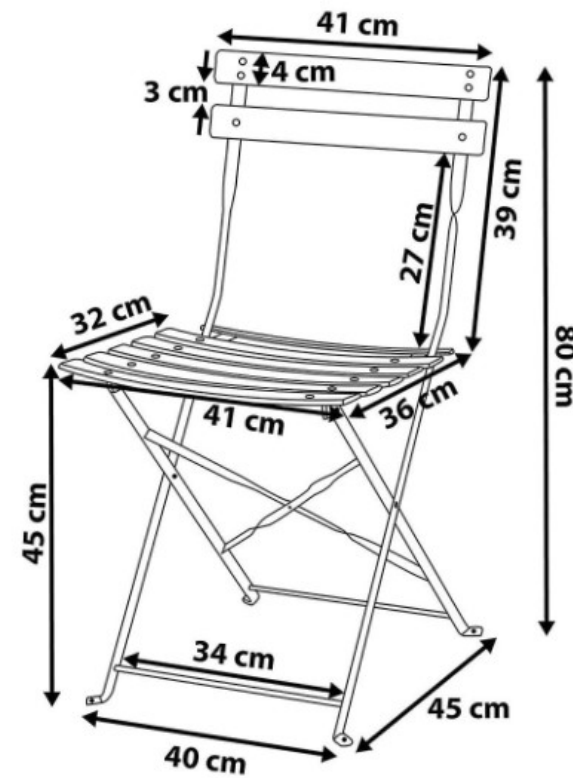
I consider it to be beneficial if balcony furniture are small, but not too small. Balconies are often quite restrictive in size and therefore it's nice to have furniture that doesn't take up a lot of space. However, it shouldn't be that small so it conflicts with the comfort too much. **With this in mind, the piece of sitting furniture should be a single seater and not a sofa.**

Ability to replace parts refers to the ability to be able to keep a piece of furniture without it aging too rapidly or breaking - and if so, have a simple and straight forward solution on how to repair/refresh/refurbish the product.

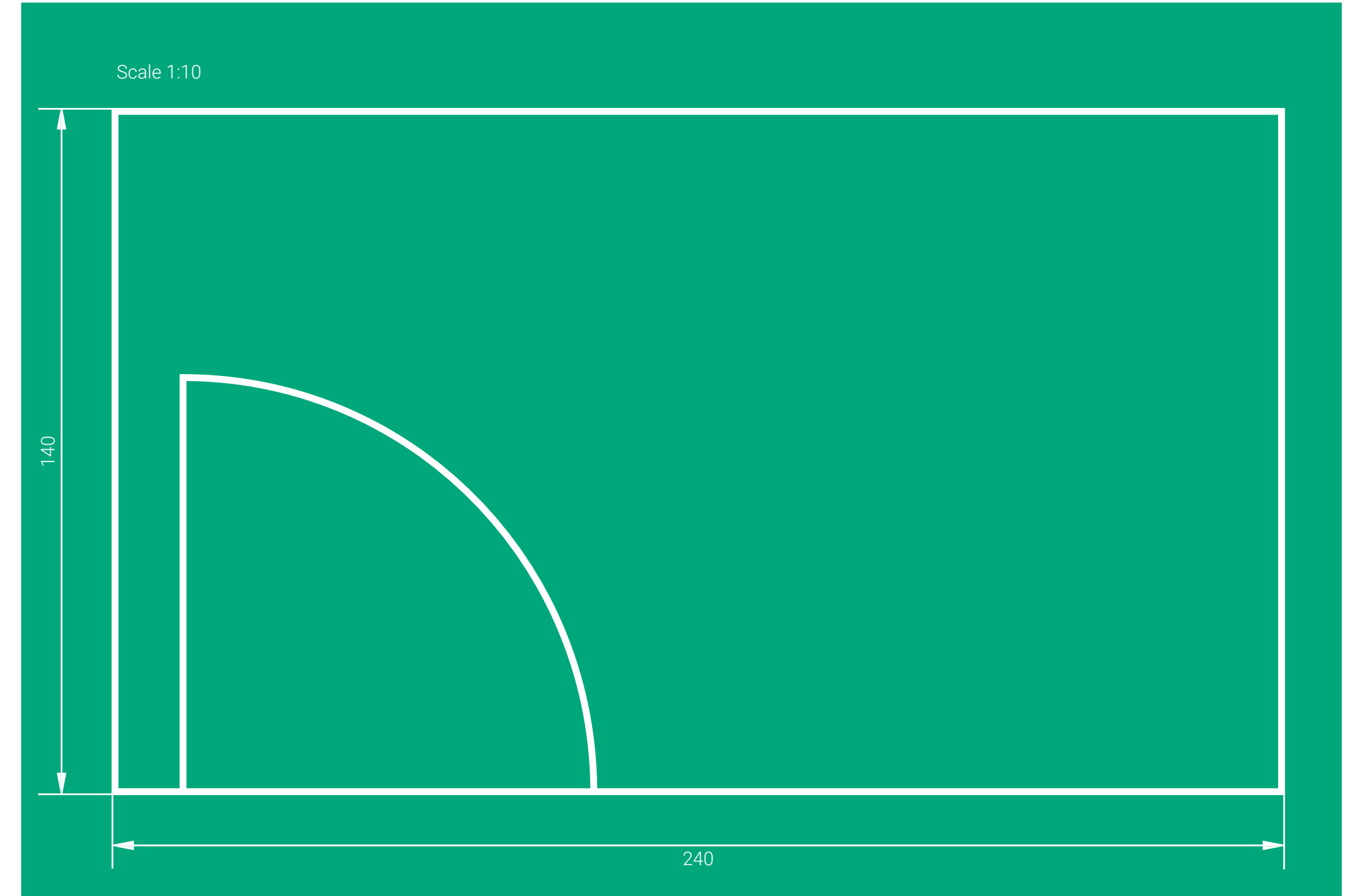
HOW BIG IS A SMALL BALCONY?

According to an article called *Balkongbyggnation* at Styrelseguiden.se, the most common measurements for a balcony built in Sweden is 140cm x 240 cm as explained on the opposite page (2022).

When it comes to the possible measurements of the chair, I've chosen to proceed from the metrics of the Fiori as a starting point. I want the balcony chair to be slightly bigger than the Fiori, as explained on the previous page.

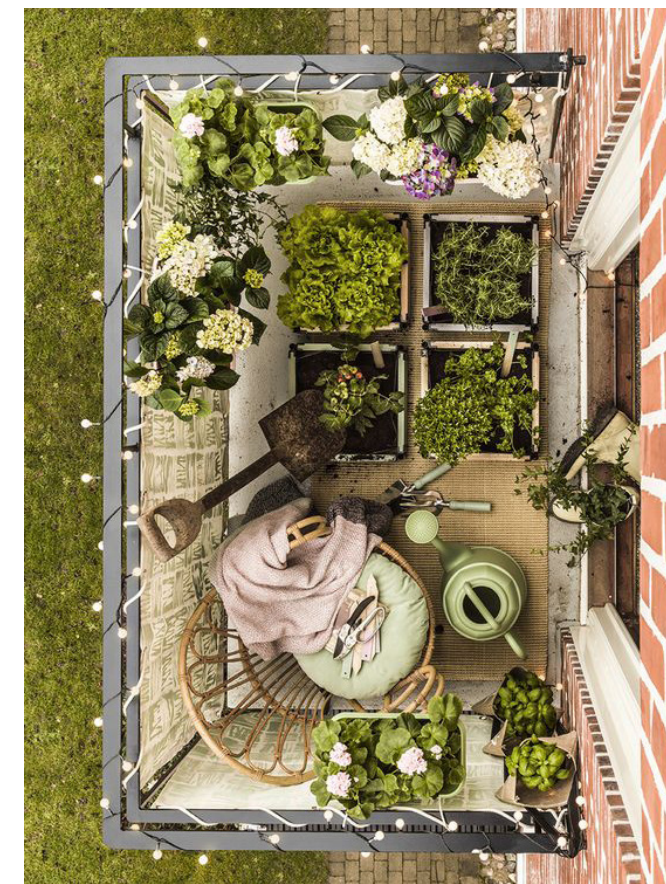


Fiori chair measurements gathered from chilli.com (2022).



Small scale farming is a growing (pun intended) interest among many people living in the over developed world. People are realizing that they lack connection to the earth, crops and foods that they eat, and want to become more grounded when it comes to knowledge that was common sense less than a hundred years ago.

Therefore, many have turned to their balconies for farming room. The balcony isn't just a place where you hang out anymore – **it has another purpose as well.**



ATTRIBUTES

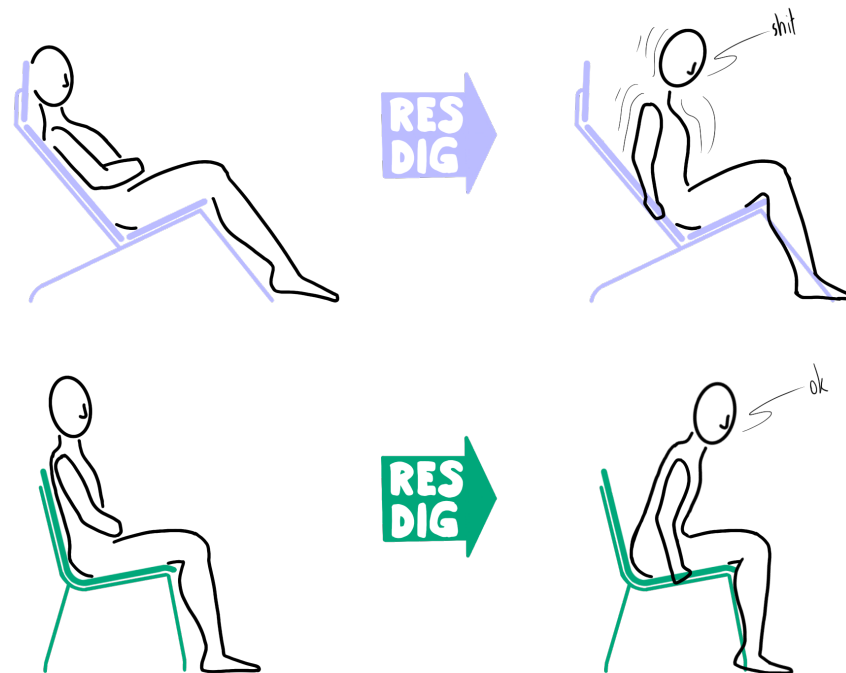
There are some key attributes that I find to be of importance while giving form to a piece of balcony furniture. Comfortability, to get as much as possible from a small surface and the ability to be assembled and disassembled are all key points.

Comfortability

In this project, I describe comfortability as *comfortable enough to sit in for most people*. I try to include most age groups, and therefore have to avoid for example steep inclinations that can make it difficult for less movable people to get up and down. However, I would also like to avoid being too ergonomic – it will be a leisure chair and not the most ergonomically correct chair you've ever seen. **It's important to be able to age with the furniture.**

How compact?

My piece of sitting furniture should be able to fit on most balconies. Aside from that, "compact" could mean that it should either be foldable for storage during winter, or intuitive enough to disassemble for storage etc. However, it



seems like many people (more than 50% the people answering my survey) keeps their outdoor furniture outside all year around. Then maybe, it isn't worth to make something foldable or disassemble for the sake of storage, right? Some kind of simple disassembly/foldability could still be good, but for occasions as moving. Therefore, it doesn't need to be *that simple so you can do it once a year*, more like once every fifth year.

Because of the common lack of space on a balcony, I've chosen to focus on the chair itself (or with a second chair) rather than chairs and table combined. As I mentioned before, *the chair comes first*. If you don't have space for a whole set (table included), you just buy the chair/chairs. With that said, the chairs should be able to use in combination with a table if applicable.

Dis- & assembly

It is my belief that simple pieces of furniture should be assembled by the consumer. This is beneficial because it makes the step smaller for the customer to disassemble or repair their furniture when needed. I want to make it as easy as possible for the consumer to understand how to repair their product if necessary and at the same time try to make the mechanisms that hold the piece of furniture together as simple as possible.

"Timeless design"

In an article in The Spruce, Lauren Flanagan writes that it's important to create some kind of focal point. I, myself, can appreciate when the functioning parts are the point of focus - you know how something work immediately when it comes to e.g. foldability, adjustments, how a chair can stand up etc. This creates a feeling of *transparency* and communicates *honesty*. (L. Flanagan, 2019)

For something to become timeless, it needs to be able to withstand time - an important factor when choosing shape and material for an outdoor product. The chair should not rust, go bad or break when exposed to the Scandinavian weather.

Transparency

Transparency is an honesty in concept, production and function. It can be that customers are shown how something works just with the help of the form language. I see a growing need for transparency, since people have lost the connection to how things are made. A clear example of a reaction to this loss of connection is that more and more people is starting to grow their own crops. A reason for this is that people have lost the connection to how their food is produced and want to gain that connection back. My theory is that the same will apply to products, and not just food, in the near future.



Satisfaction

This is one of the most universally positive feelings there are. The feeling can arise when you e.g. see a well-organised shelf, a well thought-through function or when a lid fits a container perfectly. These are all factors that could be translated in design.

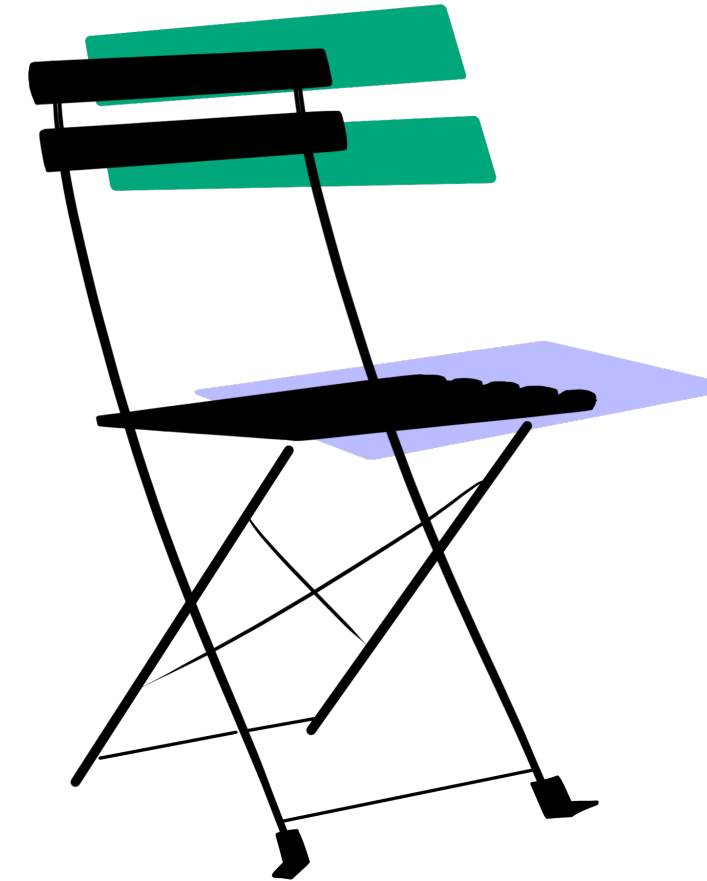
Pricing

For the classic Fiori, a chair that communicates affordability but not longevity, people pay around 500 SEK. People are willing to pay around 3000 SEK for the Grythyttan A2, from a well-established brand with a long history of good quality. Therefore, pricing should be between 2000-3000 SEK (Swedish krona, around 200-300 Euros). I want it to be affordable enough for people who want to upgrade from the Fiori, but also expensive enough to communicate longevity and quality.

Deliverables

In this project, the deliverable isn't just a chair - it's also a circular plan with (hopefully) some new ideas that can be implemented onto other products and production processes.

FINAL BRIEF



How might we create a piece of **BALCONY SITTING FURNITURE** that is compact, comfortable and have such a **VALUE** that the owner lets it be around long enough to become **MEANINGFUL?**

FUNCTION ANALYSIS

- enable **sitting**
- communicate **meaningfulness & personal value**
- facilitate **individual uniqueness during production**
- facilitate **customer dis- & assembly (~once/y)**
- age **gracefully & repair if necessary**
- be **compact, yet not small**
- be **comfortable for an evening of sitting**
- be **timeless in it's design (subjective)**
- be **transparent in processing/production methods**

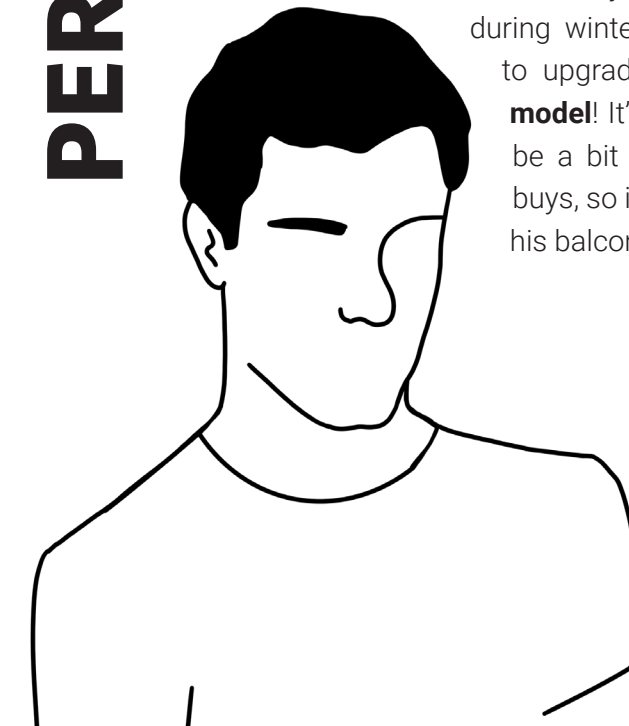
PERSONAS

Alex

This is Alex. He lives in an apartment in Skåne. Skåne is quite windy, rainy and snowy in winter time, but in summer it can be quite warm and sunny.

He **uses his balcony for some small scale farming** where he grow his spices. He likes having friends over and they enjoy sitting on the balcony on warm summer evenings.

However, lately he's been finding here **classic cheap chair to be a bit uncomfortable** – the butt falls off a bit. They're **good when storing** during winter but it would be nice to upgrade to a **slightly bigger model!** It's also perfect timing to be a bit conscious on what he buys, so it will last a long time on his balcony!



Kelly

This is Kelly. She is moving from her parents house to an apartment in the south of Germany. Weather is quite similar to the south of Sweden, apart from more sun and slightly longer warm periods.

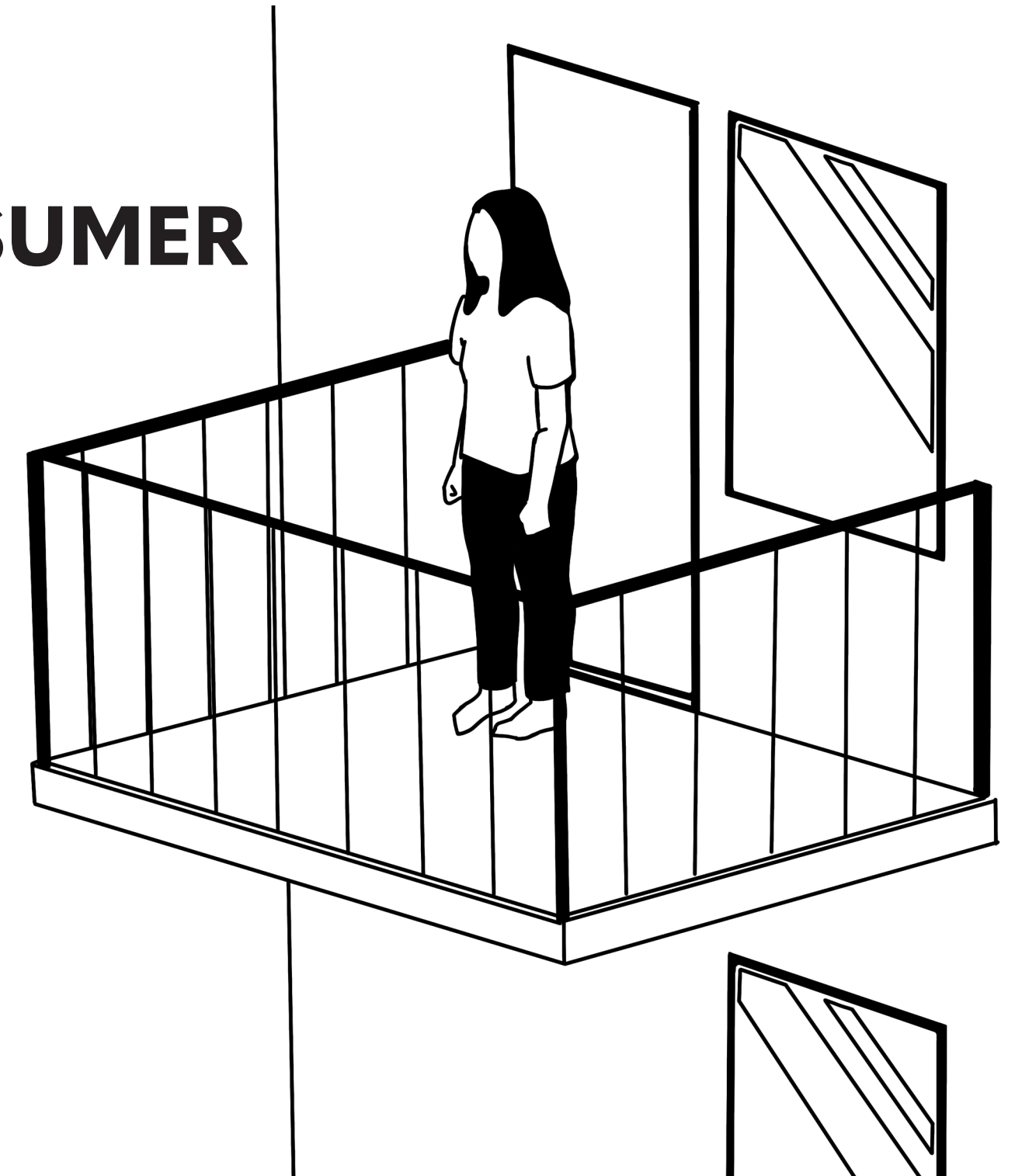
Her parents asked her if she wanted to bring their beloved *Grythyttan* outdoor furniture to furnish her new balcony but she kindly declined, even though she's always been a fan of the comfy chairs and how **easy it is to replace the parts** that takes the most strain.

Kelly wants to be independent and buy her own outdoor furniture – the "Grythyttan" chairs will be a **nostalgic** part to come home to when she visits her parents. However, she'd like to keep the wonderful qualities of replacability of part etc. to make her furniture **stand for a long time**. She wants to take **responsibility for the environment**.



- Lives in apartment with **balcony**.
- Likes hanging out on the balcony, but **don't have a lot of space** for balcony furniture.
- Wants to **take care** of their furniture to keep them up to date for a long time.
- Buys to keep & wants a **timeless** feel.
- Wants furniture that's **comfortable**, yet not too big.
- Wants to put **value** in products, e.g. to be **environmentally responsible**.
- Wants to be **able to store** their outdoor furniture in an effective way during winter.

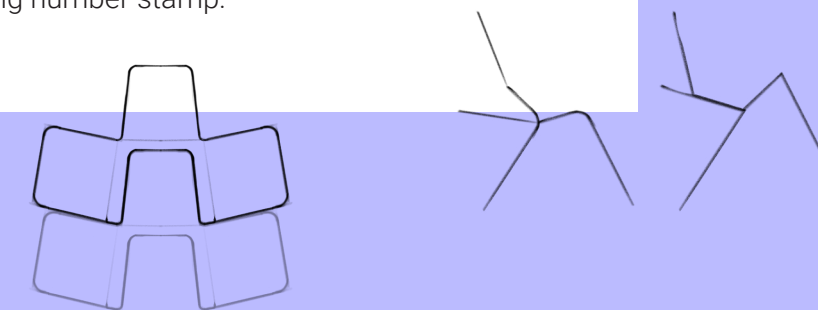
TARGET CONSUMER



IDEATION



With **satisfaction, transparency** and **uniqueness** in mind, I started exploring possible directions. To make the uniqueness intuitive and easy to understand, I chose the “individual part” of each chair to be a changing number stamp.

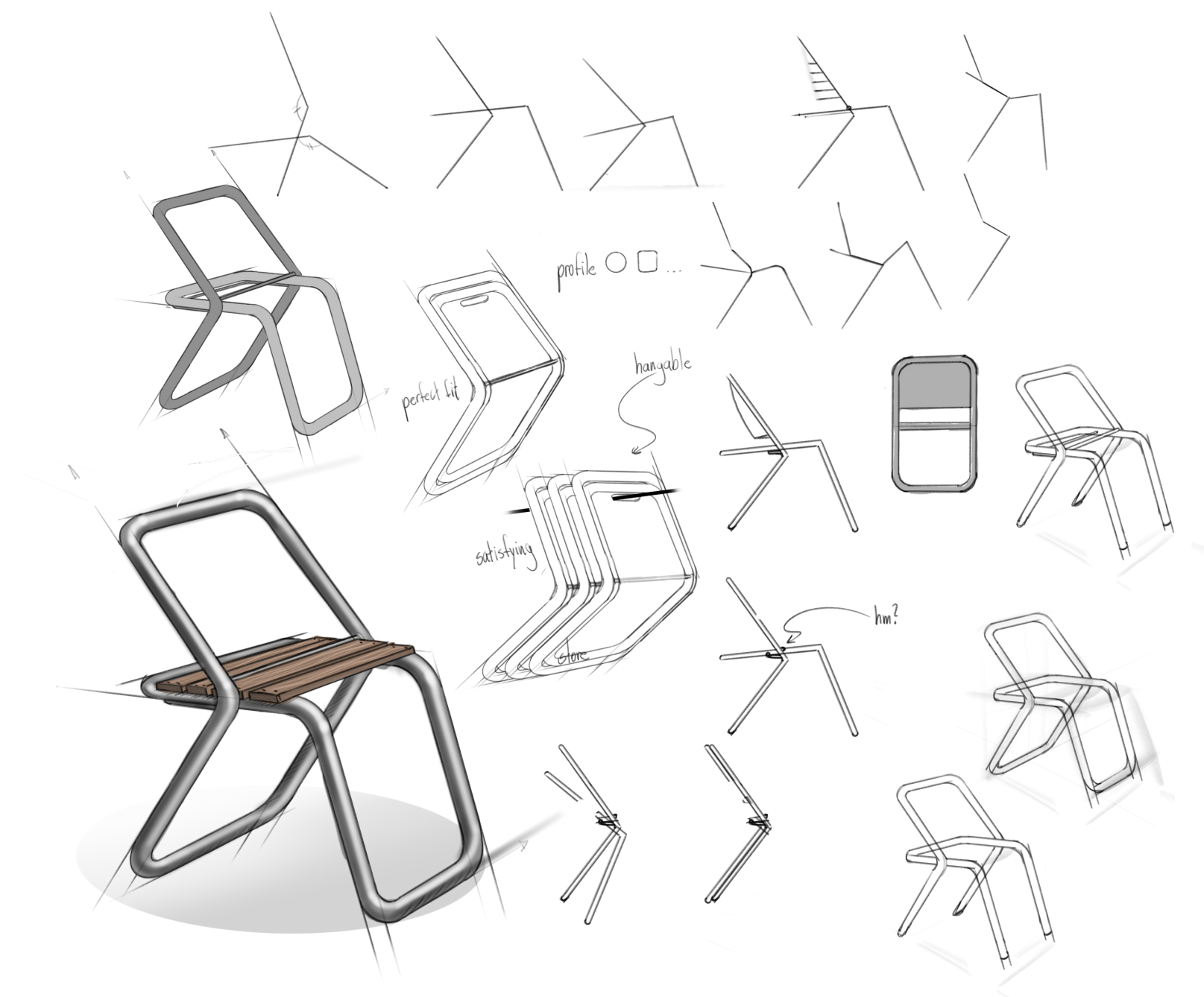
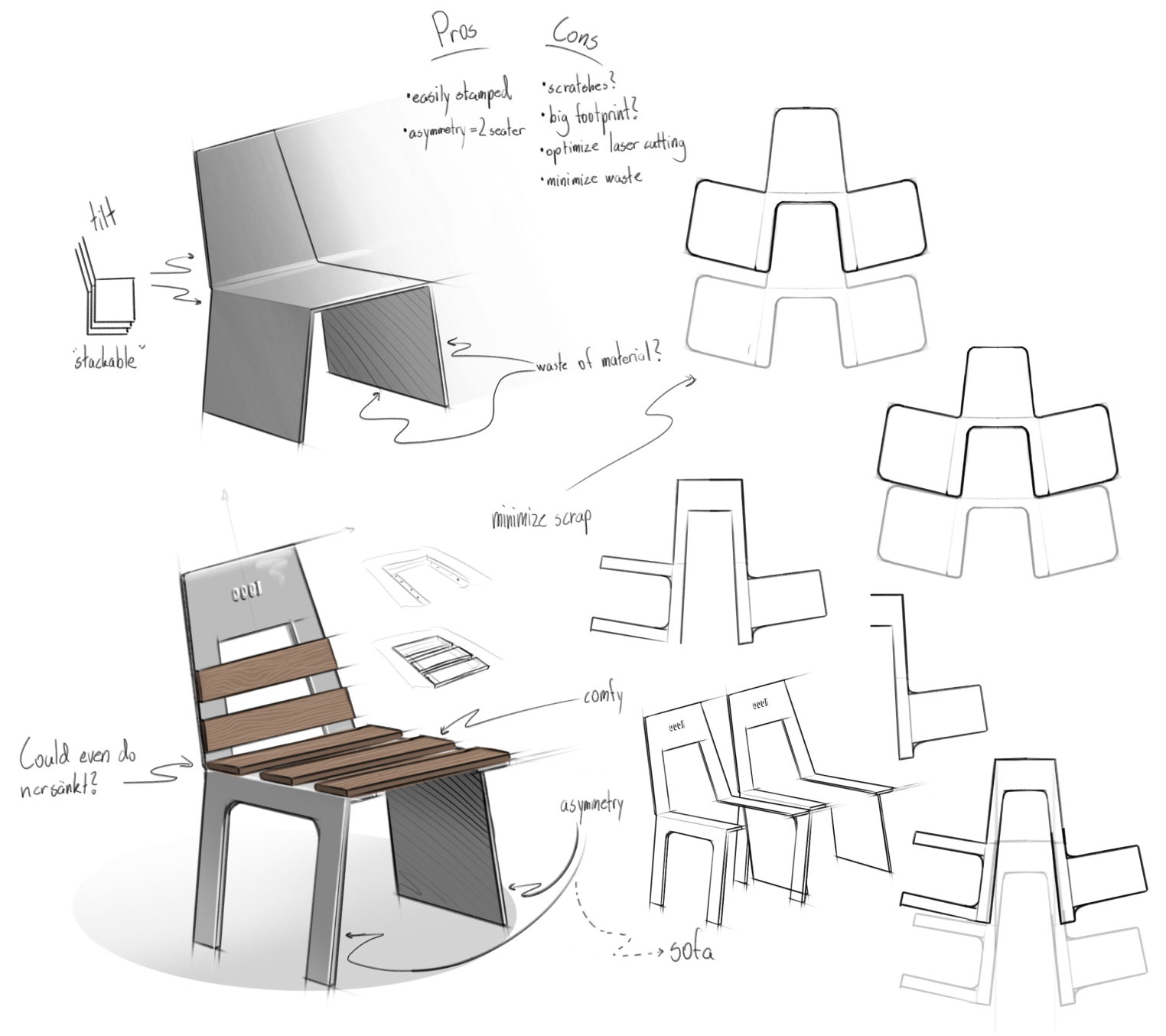




Concept 1

STACKABLE SHEET METAL

- + transparency in production
- + satisfaction in efficiency
- not fun 😞



chosen 😊

Concept 2

GEOMETRIC FOLD

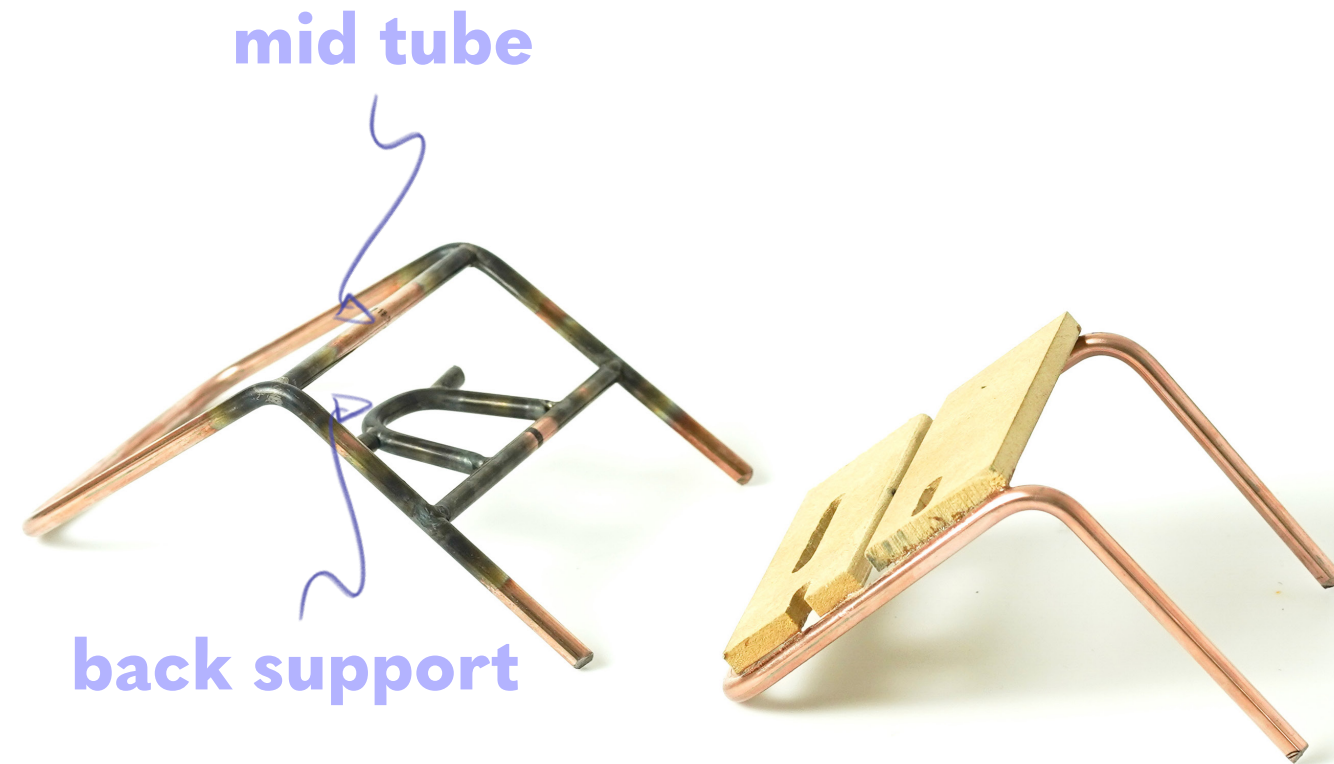
- + no hinge (satisfying)
- + semi-foldable
- + function focus (transparency)
- + carried/moved/hanged with low effort

This has been a special project for me because I've been building, and building and building! I started doing small scale models to test the overall function, then I started building with cardboard in full scale. I came to the conclusion that I needed to build full scale working prototypes in order to get a sense of dimensions and form language.



MOUNTING

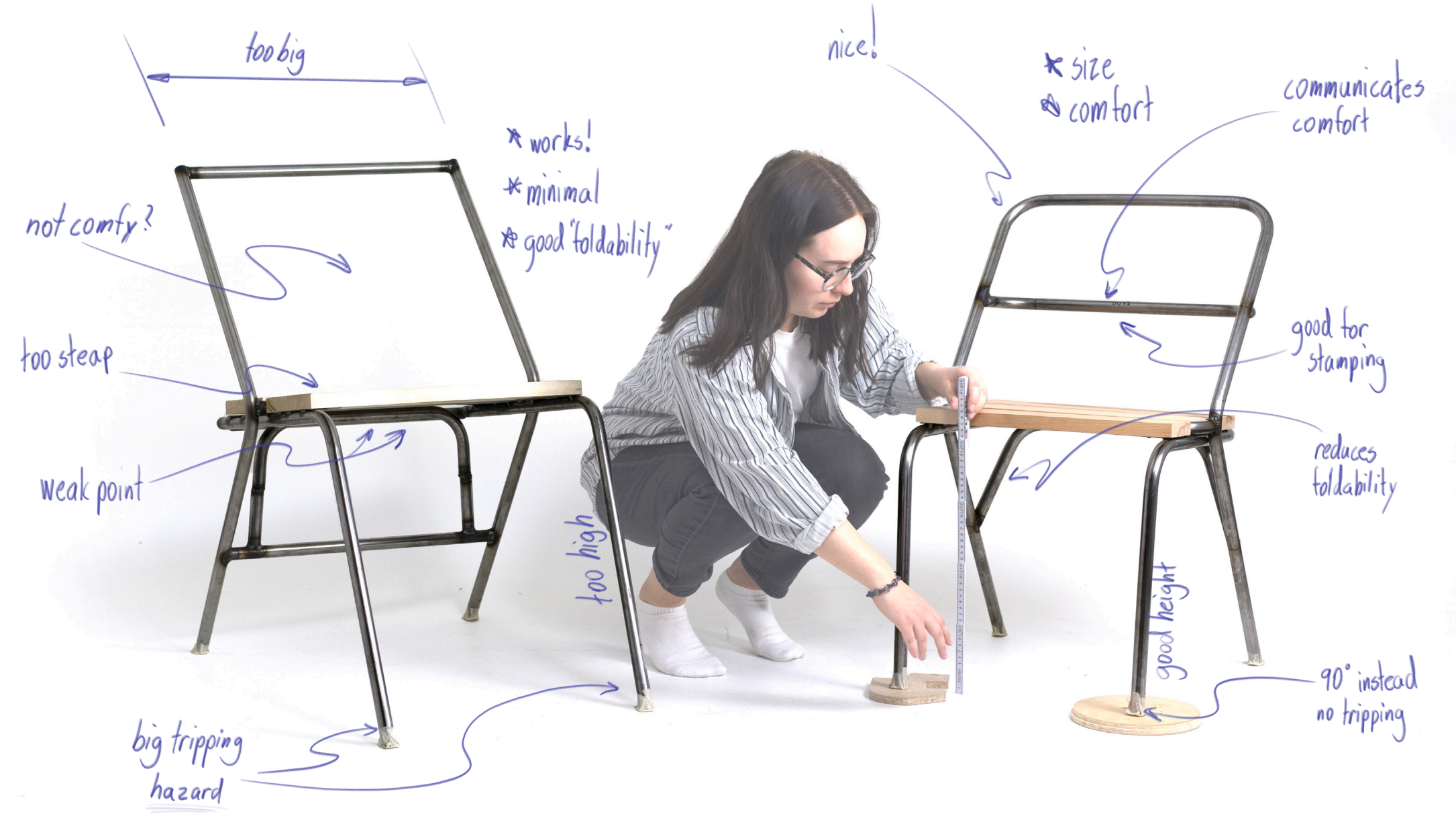
The chair consists of two parts – the seating and front legs to the right and the backrest, back legs and support system to the left. The mid tube acts as the main x-axis support and the back support holding up the seat. Two parts facilitate ease of transportation and satisfaction in one step mounting.

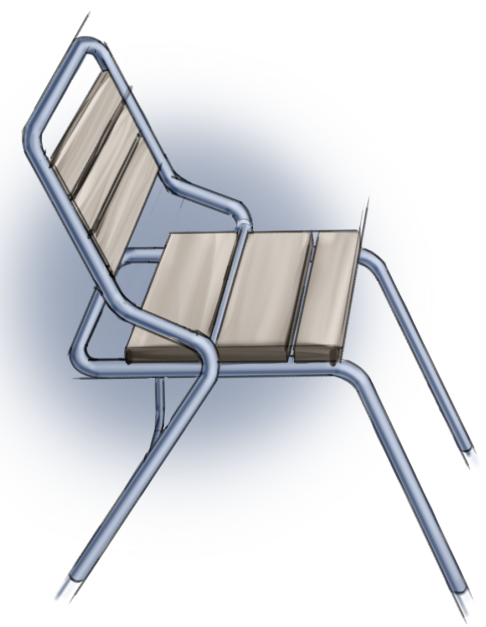


PROTOTYPE 1



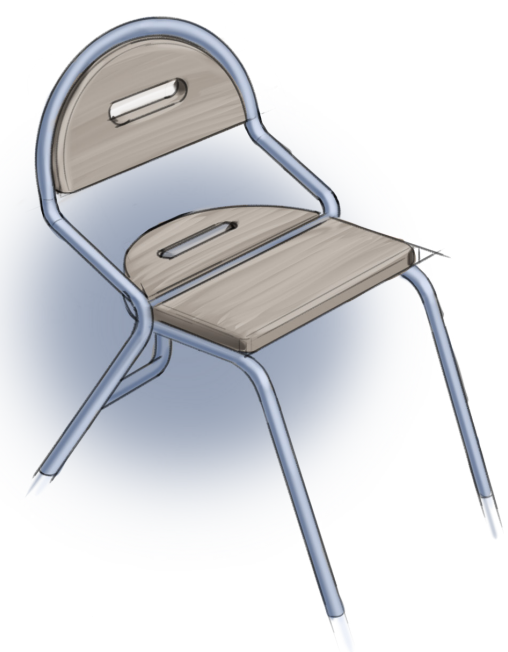
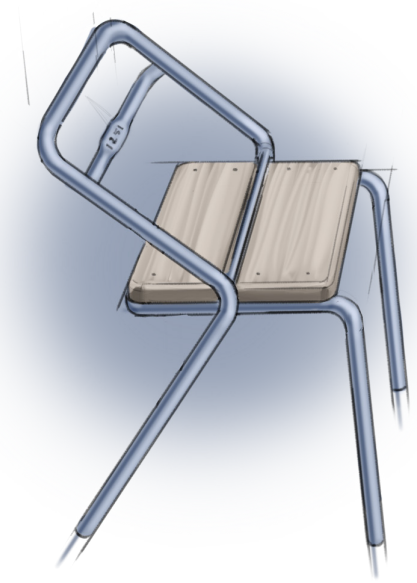
PROTOTYPE 2





FORM EVOLUTION

One of the biggest issues with Prototype 1 was the front legs - they were a huge tripping hazard. Since one of the satisfying attributes of the concept was that the two parts were having the same profile, I tried out different profiles to see if I could minimize the tripping hazard. However, I came to the conclusion that it wouldn't take away to much of the satisfaction if I made the seat part 90 degrees instead of 110 like the back part.



C.M.F STRATEGY

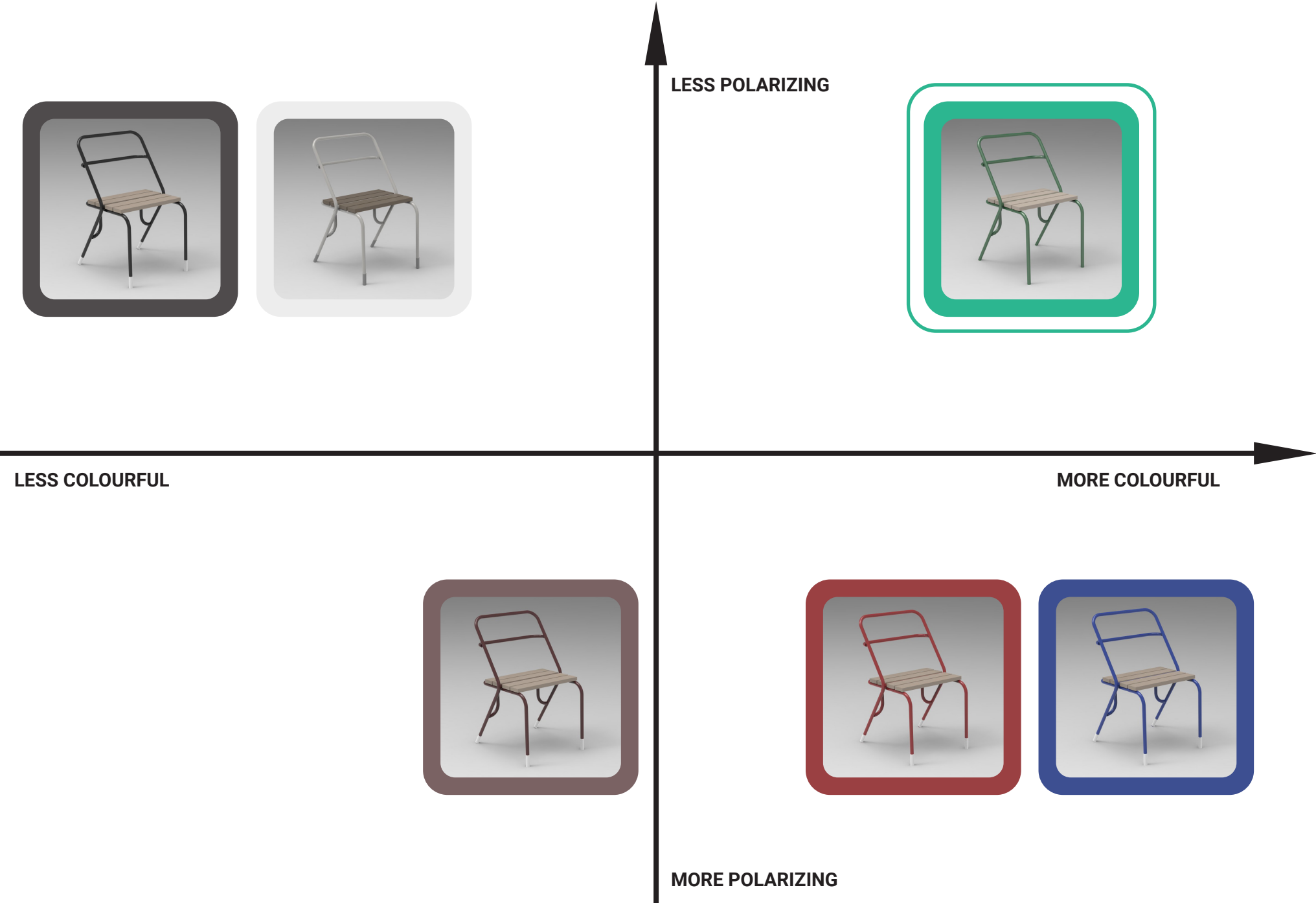
Material selection is of great importance when it comes to circularity. For the metal tubes, I chose powder coated steel since we have a lot of well established steel companies (both for mining, producing and recycling) in Sweden – something to appreciate and cherish. It also has great recyclability – in the Nordic countries, about half of the steel comes from recycled steel and more than 50% of new produced steel comes from scrap and not iron ore. (ssab.se)

Steel also makes the chair heavier – an important factor when it comes to communicating value and durability. Aluminium is also commonly used in outdoor furniture and can be anodized locally, but in this case aluminium was too light. The dimensions of the tubes would've also increased, something I didn't want.

Powder coating creates the possibility to choose colour more precisely than anodization, mostly because there are

more colours available on a local scale. I chose to work with a local powder coating company, Brantviks Måleriverkstad AB, and decided to go for a saturated blueish green. I wanted to be a statement colour, but keep the threshold low for more conservative customers. Green is good, because it communicates *nature* in a way that makes it possible for colourful customers to *match it with colour* and for colour conservative customers to *match it with nature*. Green is less polarising than other bright colours, according to me.

I chose ash for the seating. Ash has a long history of being used to build ships and can be harvested in Sweden. Since the desire was to keep the wood looking as raw as possible for as long as possible, I decided to treat it with a light pigmented linseed oil. Other possible types of wood can be pine or oak.

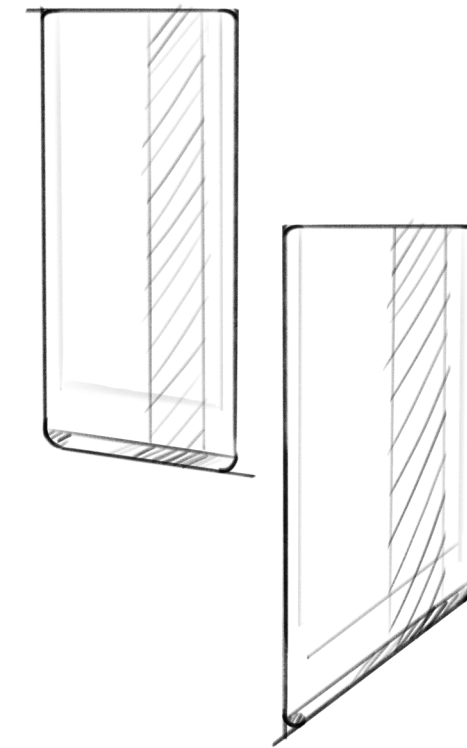


FEET

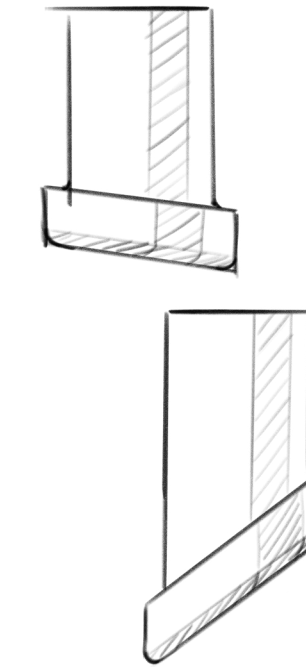
To keep the integrity of metal tubes and to prevent rust when being exposed to the weather, it's of importance to make sure that no moisture reaches an untreated part, such as the inside of the tubes.

The feet were first thought to be a kind of sock in rubber, to balance the form language and take a little bit of focus from the seating and backrest. However, it ended up being too over-designed and wasn't necessary for the chair.

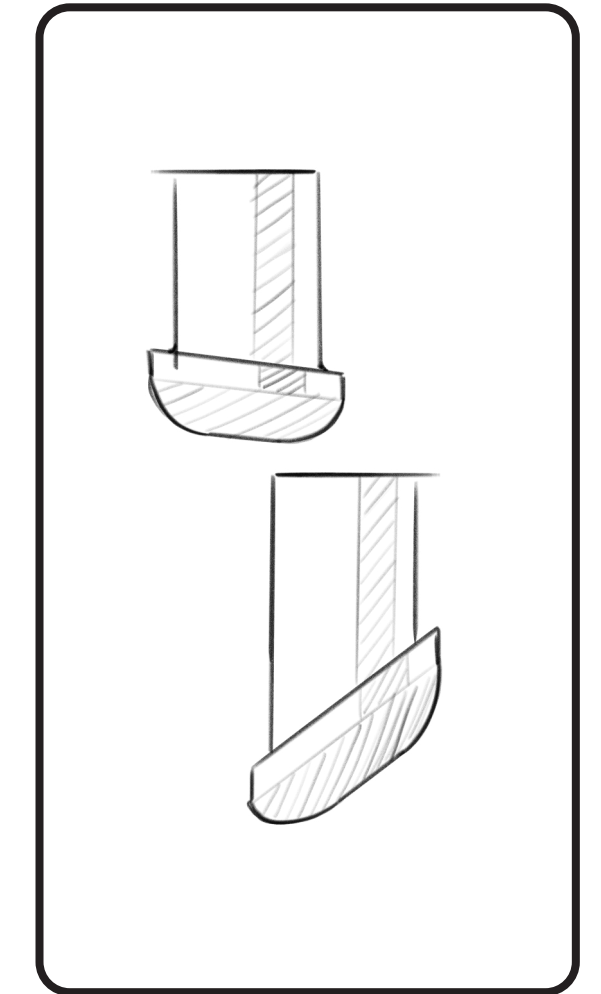
Instead, a minimalistic element was added to prevent moisture from getting in. It also prevents the chair from damaging the floor/ground.



Discarded because of over-design.



Discarded because it makes the chair feel heavy.



Chosen for their simple, subtle and minimalistic expression. They lift the legs up, which creates a light feeling.

STAMPING FONTS

The focal point of the chair should be the unique feature – the number stamp. An industrial font was chosen as an homage to the industrial revolution with a focus on mass production.

Even though it will be CNC milled and not stamped, it's still an homage to the old manufacturing days, where an engine or a machine in a factory were made to last forever. The chosen font got picked for its similarity to these old stamping fonts and was cleaned up a bit.

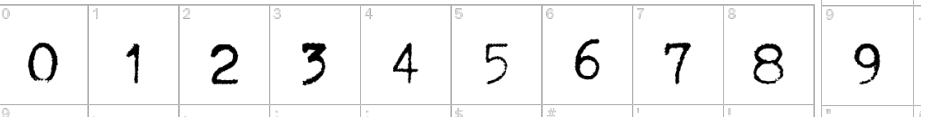
D3 Euronism



Mechanical Fun Font



Mechanical Machine Font



Engineering Plot



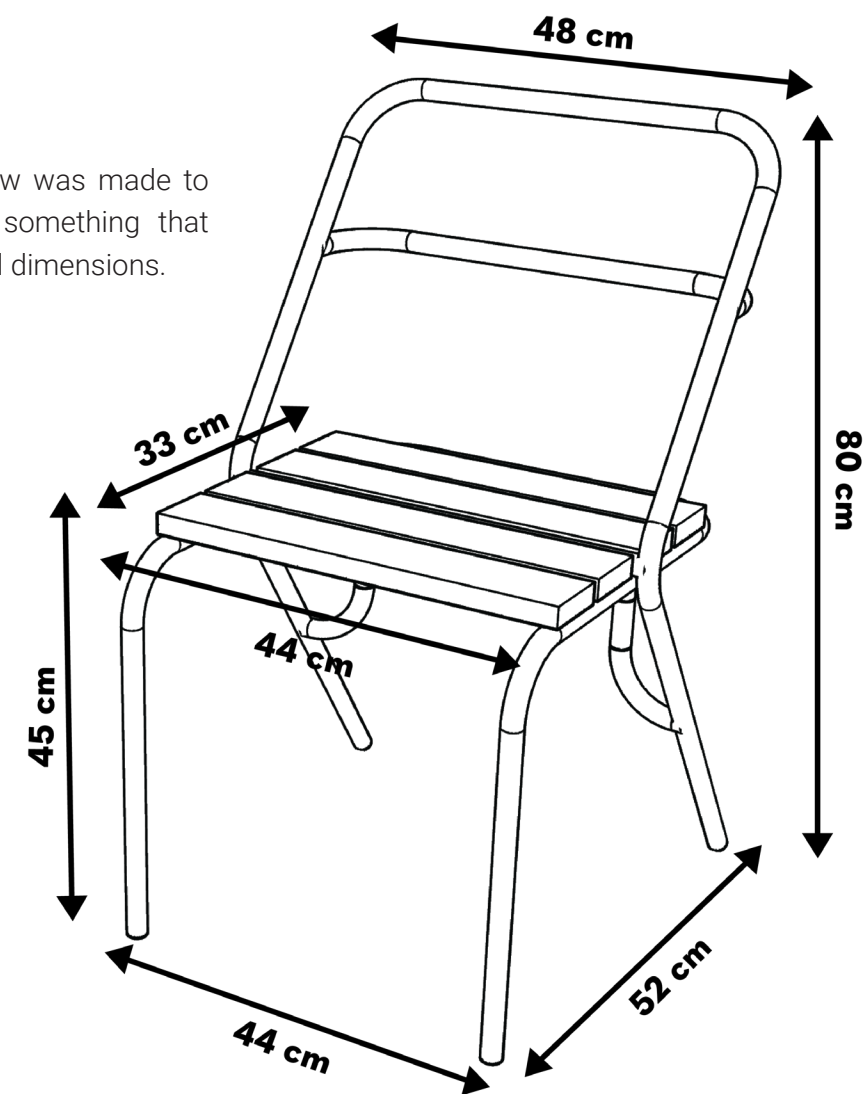
Reckoner



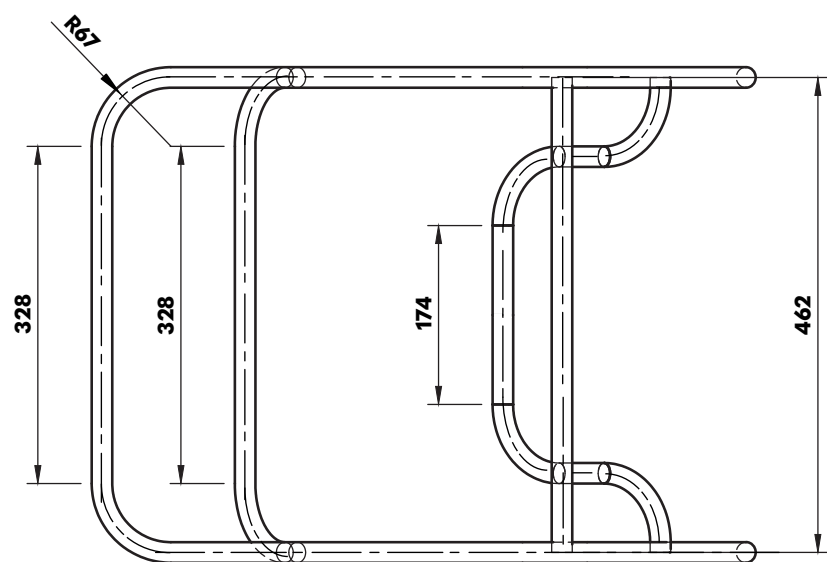
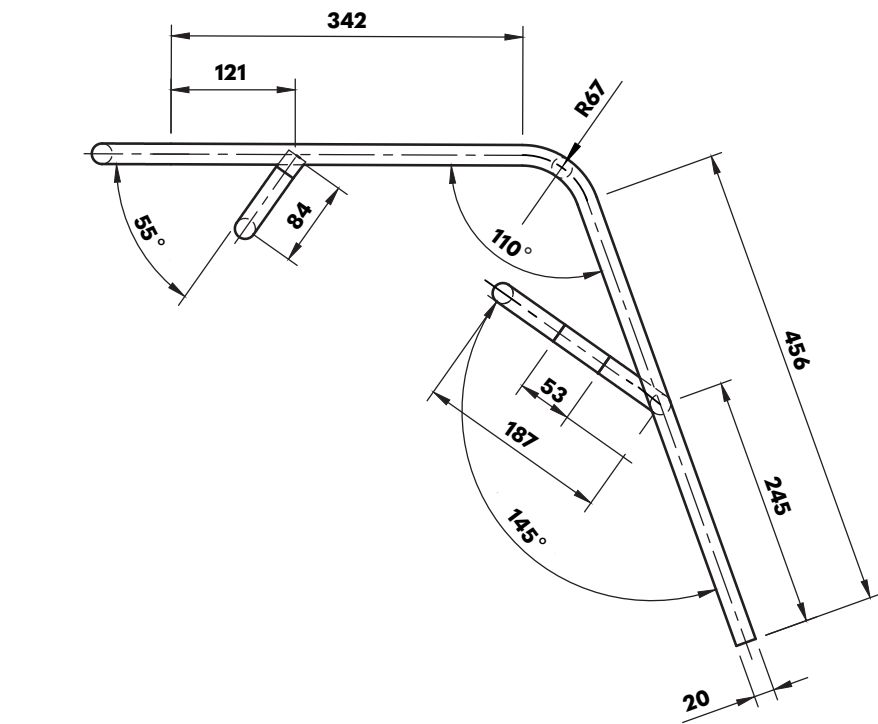


TECHNICAL DRAWING

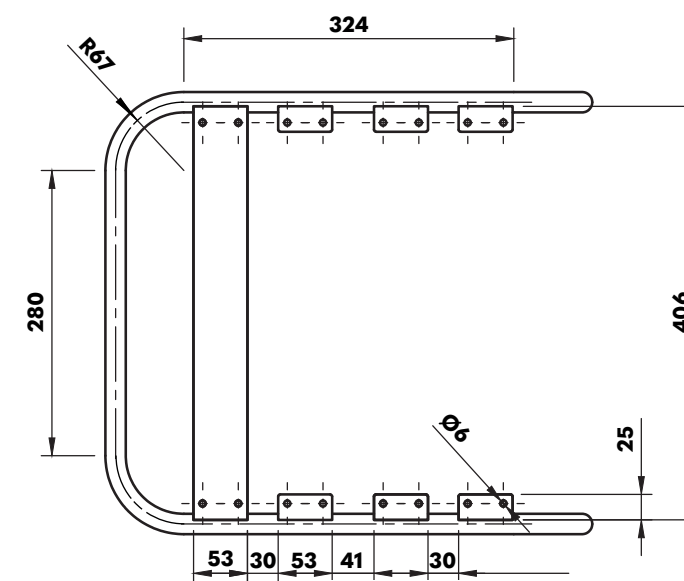
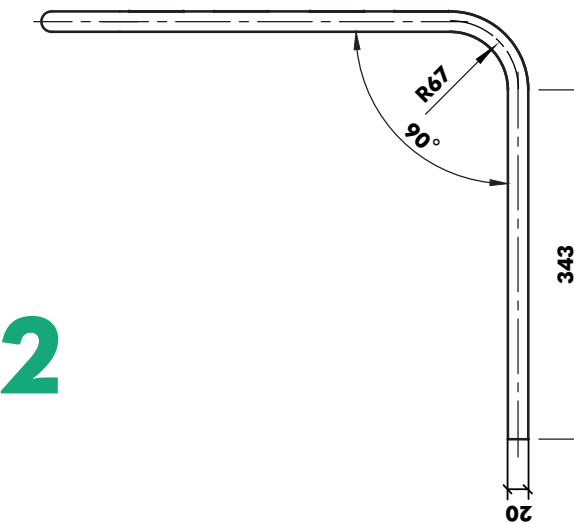
Before the technical drawing, an overview was made to showcase the main measurements – something that could be used to get a sense of the overall dimensions.



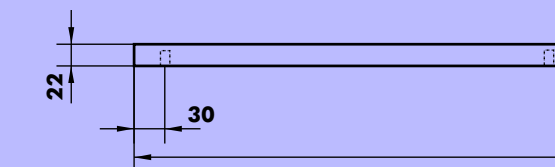
PART 1



PART 2



(mm)



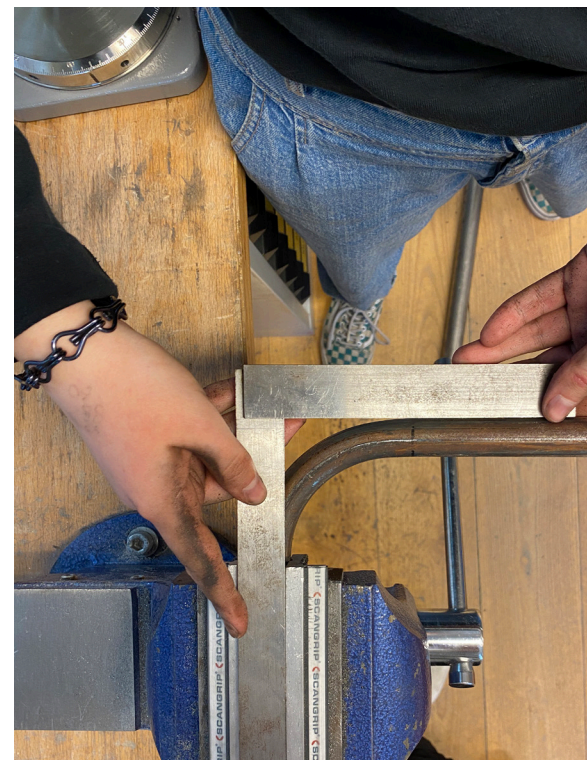
x4

WOOD

FINAL BUILD

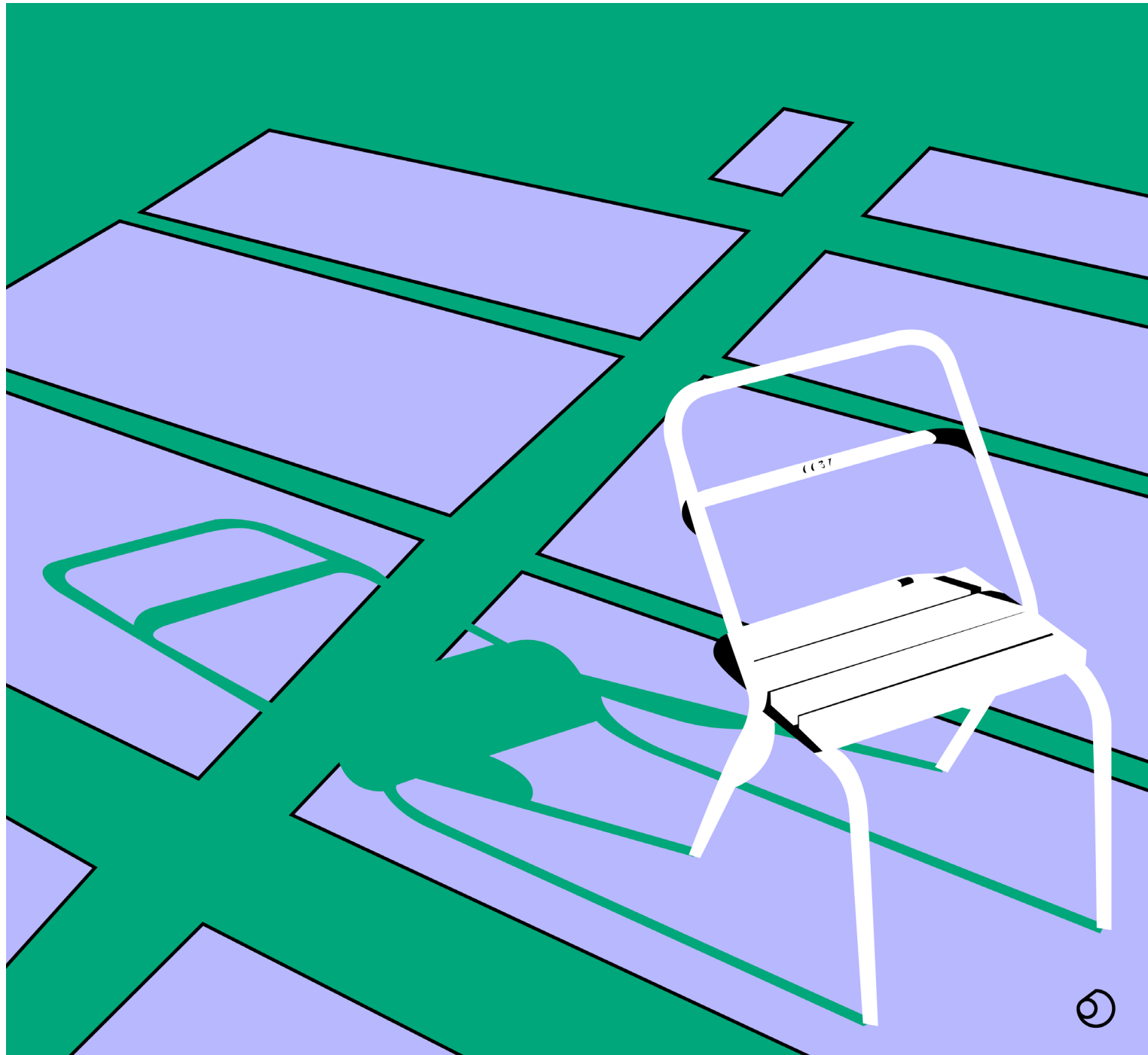
I had the privilege of having everything I needed for the final build at the school. First, I befriended the bending machine, then I prepared the sheet metal for the wooden seating simultaneously as notches were done to make the tubes fit perfectly onto one another.

When it was time for welding, I once again relied on Bert, who is a master of the craft. I later turned to Brantviks Måleriverkstad AB in Malmö for the final powder coating.





RESULT





KONSTANTEN*

* THE CONSTANT in English. Plays on circular economy and the fact that every radius of the bends in the metal frame are the same.



The chair facilitates **one step mounting** and the possibility to **carry it with one hand**. The parts fit into one another for a stable and **compact packaging solution**.

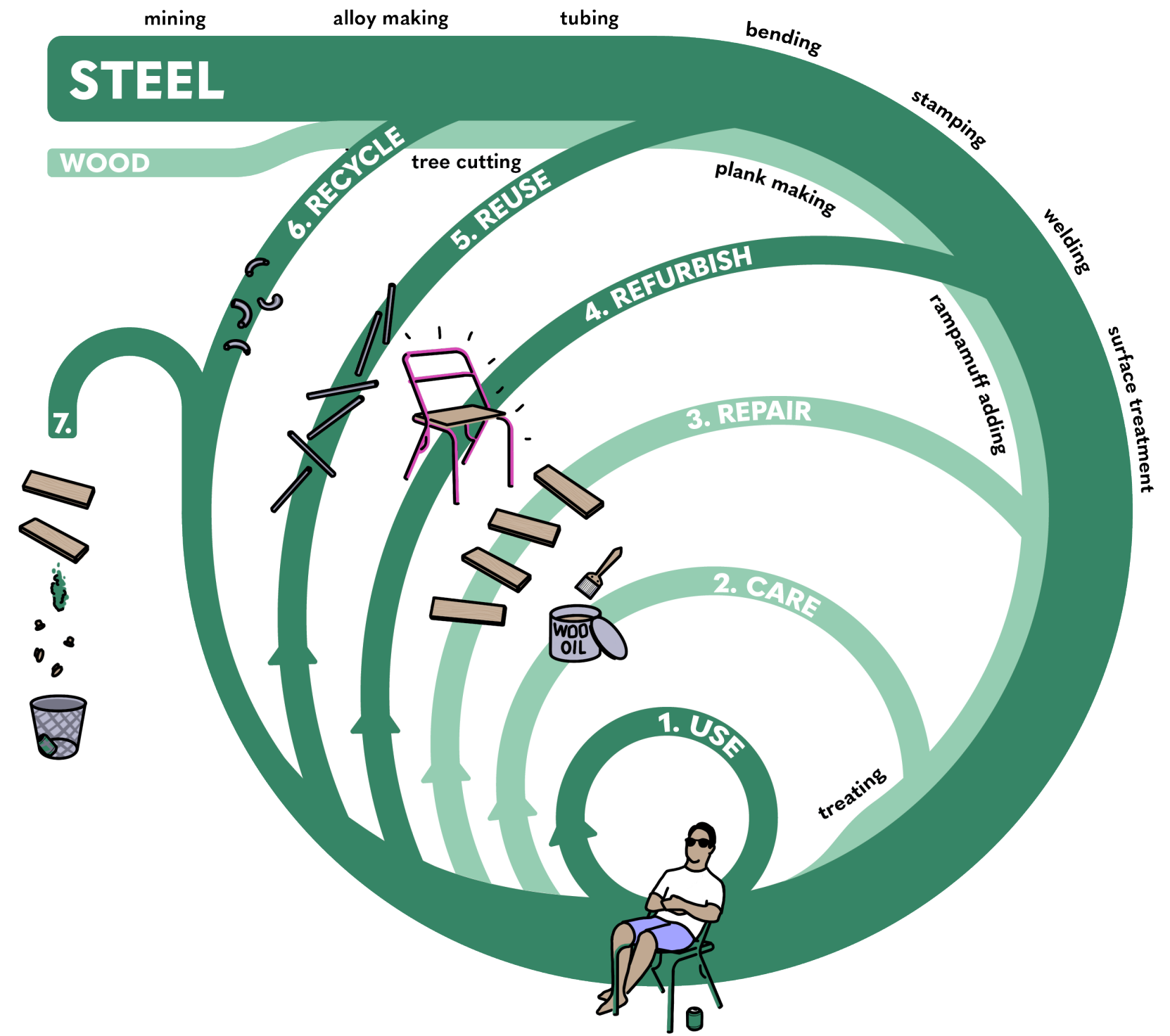


UNIQUENESS

The chair KONSTANTEN will have a CNC milled numbering, creating uniqueness. They mimic the batch numbers that you usually see on old machines or the RAM numbers that makes each bicycle unique – but here they are in focus.

You might have noticed that my final prototype has the number 0037 on it, while 0001 would be the most logical to have on the first ever chair. The reason for that is that I wanted to communicate early mass production – if I would have chosen a number that's too low then it wouldn't communicate mass production and if I would've chosen a number that's too high, it wouldn't symbolise *early* production.





CIRCULAR PLAN

PRODUCING THE CHAIR

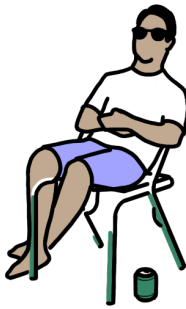
Sweden is one of the leading countries in the EU when it comes to steel production. Even though steel production is quite energy intensive, there have been some major breakthroughs in recent years when it comes to energy efficiency and also using hydrogen as a source of energy. It also has great recyclability – in the Nordic countries, about half of the steel comes from recycled steel and more than 50% of new produced steel comes from scrap and not iron ore. This makes steel a good fit for the balcony chair. (teknikhandboken.se, ssab.se)

Since steel has been locally sourced in Sweden on a great scale since the mid 1800's, Sweden also has many local tubing, bending and welding factories. It should be possible for the chair to not leave Sweden during production, decreasing its need of transportation.

When it comes to the wood used, I chose between the types that could be harvested in Sweden. I've used ash, but both oak and beech would work just as good.

1. USE

The first and most self explanatory part of the circular economy plan is the usage of the product. You should never buy a product that you simply will not use. This also includes how you handle a situation when you don't use a product that you've already bought – sell it or give it away! Never *just throw it away*.



2. CARE

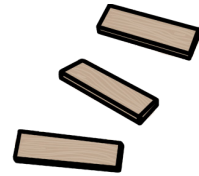
The second step in circular economy is to nurture the product in its finished state for as long as possible. This includes treating the wood with a good surface treatment – and of course, if you don't want anything with the chair to do anymore: Sell it or give it away!





3. REPAIR

If something breaks or starts to look worn out, it needs to be easy to replace. In the case of the balcony chair, the first thing that will start to look worn out is the wood. Even if treated correctly, the unpredictable weather of Scandinavia will make the wood move and look old quite fast. If the owner of the chair doesn't enjoy the look or if the seating has even started to feel uncomfortable, the wood should easily be replaced.



My solution to this was from the beginning for the customer to be able to buy a "raw" wooden kit and replace the wood back home with the help of distances that comes in the package (figure 1). However, after struggling to get the screw exactly where I wanted it to be while assembling a prototype, I decided to go in another direction. The overall concept is still the same with customer assembly, but the wooden parts have rampamuffs for ease of assembly. The customer just needs a simple inset key and not a screwdriver, which makes the threshold even lower for custom-

ers to actually do it. The planks will be accompanied by a distance to make it easier to make the tube hold spacing in the middle just right.

4. REFURBISH

Even if the customer knows that it's better for the environment to keep instead of change, the lures from commercials and the ever changing cycle of trends tend to make us easily influenced. This can make us want to upgrade. Maybe the colour isn't satisfying your taste anymore?



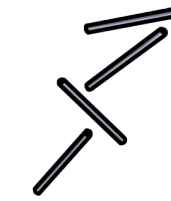
Metal that's powder coated in a professional way can usually be both covered and coated again – which opens up the opportunity for the chair to get re-coated. Therefore, every 5th-8th year, the chair owners could get the opportunity to re-coat their chairs for a reduced price than off years. There are more local powder coating companies in Sweden than we think, and the idea is that they can get

KONSTANTEN-certified or similar – meaning that they follow the 5-8 year cycles with the KONSTANTEN-founding company. Support your locals!

This creates a type of psychological goal and when the customers are looking for new furniture, they will have in the back of their minds that they, quite easily, can refurbish their already existing furniture to make it seem new.

5. REUSE

The chair that finally end up here has a broken metal frame for some reason and is deformed beyond repair. The tubes can be cut and used for other purposes



6. RECYCLE

Some pieces of the metal frame can't be used for any other purpose in its present form. To



make use of the material, it comes to the metal scrap plant to be re-manufactured into raw steel. It can become tubing for a new chair or something completely different.

7. THROW AWAY

The last resort! Hopefully, only the powder coating residue and old wooden pieces from the chair end up here.



EVALUATION

I am very pleased with how this project turned out - not only the final product, but also the whole development and my decision making throughout the process. I achieved the goals that I had set up for myself, such as creating a fully working prototype and illustrating clearly how a circular economy foundation could look for a product like this.

Function Analysis Evaluation

I managed to fulfil the function analysis I set up in the beginning of this project, with reservation for the necessity: *be comfortable for an evening of sitting*. It may be comfortable for an evening of sitting, but it hasn't been tested for a long time yet!

Two other necessities, such as *communicate meaningfulness & personal value* and *age gracefully & repair if necessary*, are both something that needs to be tried out in a real market and owning scenario. In my opinion, I have built a good foundation for these goals to be met.

I did a good job meeting the desirables: *be timeless in its design* and *be transparent in processing/production methods*. Timeless design is always interesting to discuss and it's very subjective - with my ruler, I made it.

Form Evaluation

The form communicates *honesty, transparency* and *satisfaction*, which were my main feelings that I wanted the chair to communicate. You can clearly see where in the process the form language and the final form came from – especially with the support mechanism tube being in focus and the number stamp as a focal point. However, the complexity of a simple chair is not to be discarded. There are always parts that could be optimised, enhanced or minimised. This is also what makes it so fun giving form to simple products - you need to revisit, revisit, revisit to get it just right. For now, I'm very proud of how the chair turned out.

Future Development

There are some details that could be revisited – the weight balance in the front legs when being put together is one of them. The weight distribution (the heavy wood and the light legs) hinders the mounting session from being more intuitive. Another thing is the back support, which could be done in another way to avoid confusion when mounting. Lastly, the placement of the back rest could be revisited to make the chair easier to carry in one hand. However, I want to empathise that the existing prototype works well as is. There are always improvement possibilities!

Pricing

Compared to Grythyttan, the KONSTANTEN chair has some extra steps in production making it more complicated to produce. Still, with my calculations (see Appendix) I could be able to manage a price of 3000 SEK per chair if I haven't forgotten some kind of taxation. However, to manage 3000 SEK per chair, my margin is only 10 %. A 10 % margin is quite medium in general, but the margin for furniture can be up to between 40 and 50 %. The new target price would be 3299 SEK.

The next step for the financial part of this process would be to receive help with the calculations from someone with more knowledge of the subject than me. If I, in reality, have managed to produce a chair that I could sell for 3299 SEK (preferably with a bigger margin though), I would say I succeeded!

Circular Economy Development

The next step of my circularity plan would be to create a real business plan surrounding my ideas regarding circular economy, such as the re-powder coating theory and how that would work in the future.

An important part of circular economy is to stay on top of what progress is being made in the world that could make it possible for a product to become even *more* circular.



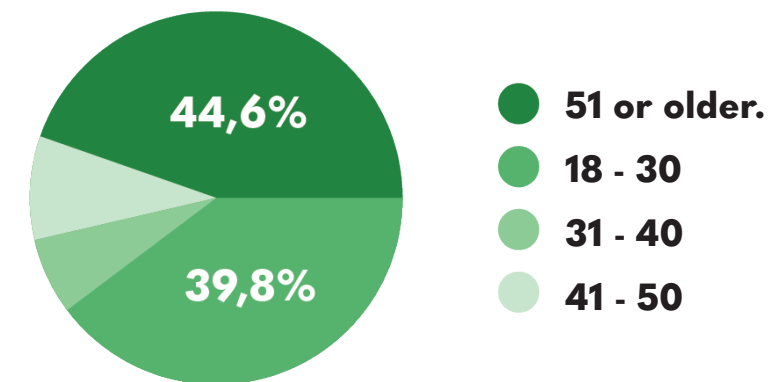
APPENDIX

FULL SURVEY

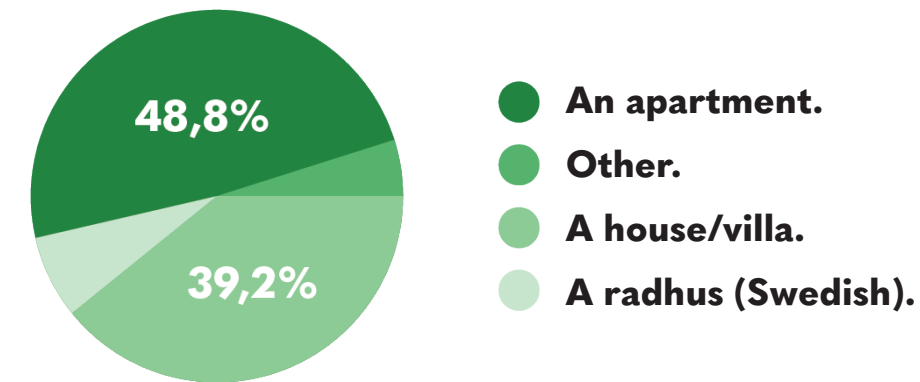
A survey was conducted to answer simple question regarding outdoor furniture. It was sent out from my personal Facebook and got 166 answers, from January 18th to January 23rd.

From the 166 answers, 48.8% are living in apartments (rikssnitt 42%), 39,2% in houses. Out of the people **living in apartments** with outdoor spaces, **96% have or will buy outdoor furniture** (80% already have and 16% will buy). ~50% use them **very often or daily** and **over 50% have them outside all year around.**

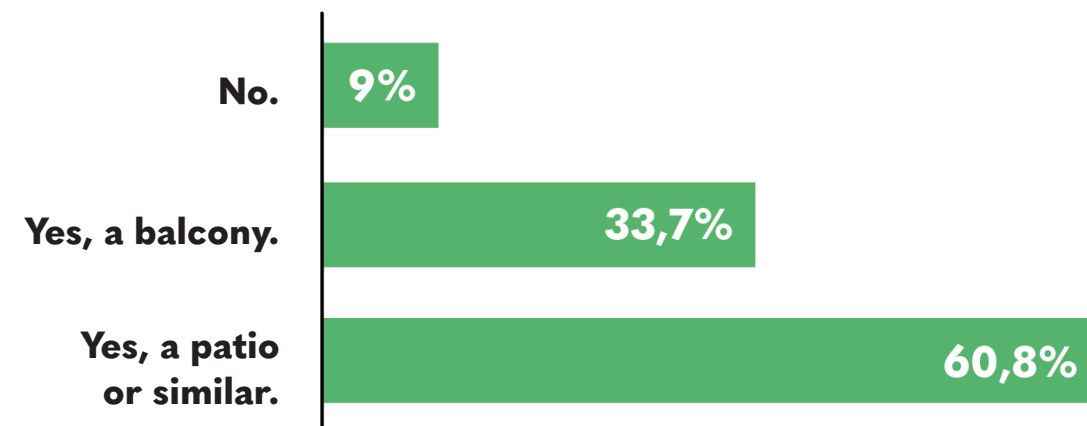
1. How old are you?



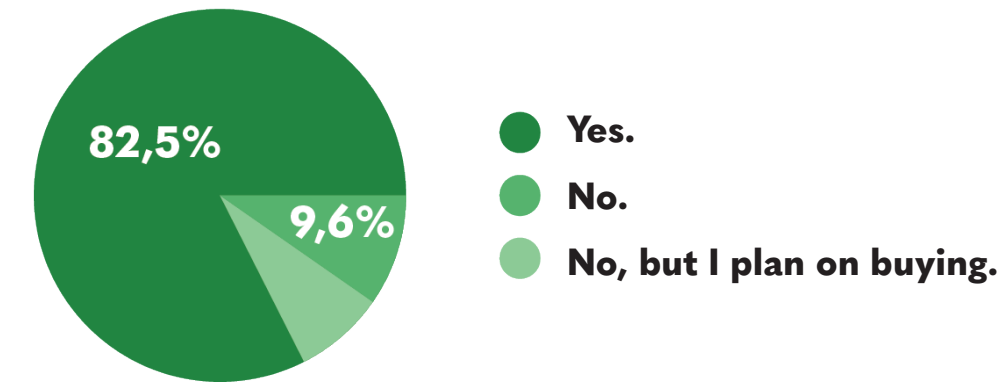
2. What do you live in?



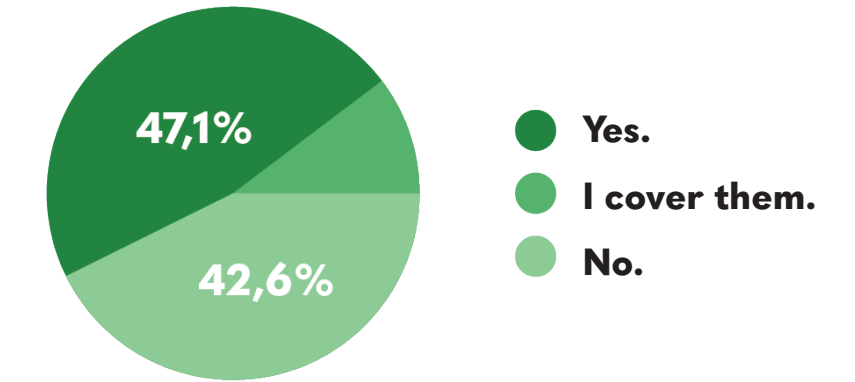
3. Do you have access to an outdoor space (patio or balcony etc.)?



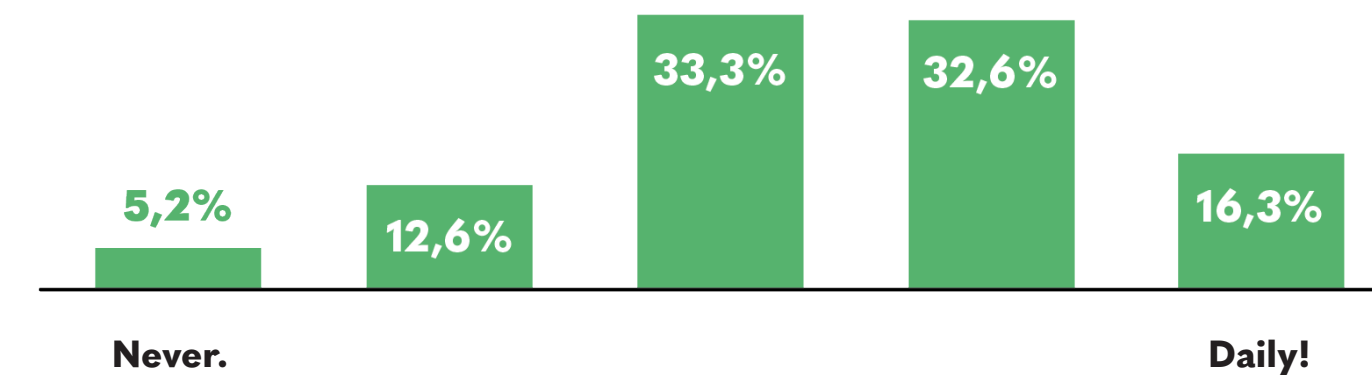
4. Do you or your household own any kind of outdoor furniture?



5. Do you bring your outdoor furniture indoors during winter?



6. When your outdoor furniture is outside, how often do you use them?



PRICE CALCULATIONS

The price calculations are based on prices, offers and estimates from May 2022 and are made by me – a non expert. The next step would be to have my calculations revised by a person that know more about taxation and transport estimates.

With a selling prize of 3299 SEK, I will create a big enough margin for me to get paid accordingly.

bockning rör: $600 + 1400 = 2000$
↑
går att pusha
 $600 + 1000 = 1800$
bockning rör (100 stolar): $600 + (1000 \cdot 100) = 100600$

notching + svets:
notch + svets (100 stolar): $800 \cdot 20 \cdot 2 = 16000 \cdot 2 = 32000$

pulverlack / stol: 480
↑
går att pusha
pulverlack (100 stolar): $(300 \cdot 100) = 37500$

material cost (rör): 5m/stol cost 80kr/m
material cost (100 stolar): $100 \cdot 5 \cdot 80 = 40000$

material cost (wood + trampmuffs + coating): ~ 120 kr/stol
(100 stolar) : $100 \cdot 120 = 12000$

transportation $\sim 10\%$
CNC / stol: 100kr
CNC : $100 \cdot 100 = 10000$

skruvar + fassar: ~ 40 kr/stol
(100 stolar): $40 \cdot 100 = 4000$

$1,10(100600 + 32000 + 37500 + 40000 + 12000 + 10000 + 4000)$
 $= 1,10 \cdot 246100 = 270710$ kr
 ~ 270000 SEK for 100 chairs without margin
2700 SEK / chair without margin
3000 SEK with 300 SEK profit / chair
 $\sim 10\%$ margin

SOURCES

1. (2020) **Sustainable furniture trend forecast – Longing for more meaning and not for more “stuff”**, retrieved January 13th 2022 from <https://designwanted.com/design/sustainable-furniture-trend-forecast-nextatlas/>

2. MacArthur, E. (2022) **What is a circular economy?**, retrieved May 5th 2022 from <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

3. Page, T. (2014) **Product attachment and replacement: implications for sustainable design**, Int. J. Sustainable Design, Vol. 2, No. 3, pp.265–282.

4. Straw, E. **Importance of Goal Setting**, retrieved May 4th 2022 from <https://www.successtartswithin.com/blog/importance-of-goal-setting>

5. Kelley, E C. (1957) **The Significance of Being Unique**, retrieved May 4th 2022 from <https://www.generalsemantics.org/wp-content/uploads/2011/05/articles/etc/14-3-kelley.pdf>

6. Flanagan, L. (2019) **6 Rules of Timeless Design**, retrieved February 3rd 2022 from <https://www.thespruce.com/rules-of-timeless-design-4002021>

7. **Balkongbyggnation**, retrieved February 1st 2022 from <http://www.styrelseguiden.se/artiklar/Balkongbyggnation-10>

8. **Är min elförbrukning normal?**, retrieved January 19th 2022 from <https://www.vattenfall.se/fokus/tips-rad/vad-ar-normal-elforbrukning/>

9. Jeanette, E. (2020) **Small Space Living as a Global 2020 Trend**, retrieved January 19th 2022 from <https://realtybiznews.com/small-space-living-as-a-global-2020-trend/98758467/>

10. **Framställningsmetoder och användning**, retrieved March 31st 2022 from <https://www.teknikhandboken.se/handboken/byggnadsmaterial-i-kretsloppet/jarn-och-stal/framstallningsmetoder-och-anvandning-6/>

11. **Stålets livscykel**, retrieved March 31st 2022 <https://www.ssab.se/ssab-koncern/hallbarhet/hallbart-erbjudande/stalets-livscykel>



1.

2.

3.

4.

5.



6.

7.

8.

9.

10.



11.

12.

13.

14.

Photos

1 & 2. **Fiori**, retrieved from https://www.chilli.se/utem%C3%B6bler/matgrupper-utomhus/kompletta-matgrupper-utomhus/balkongset-fiori-52-cm-bl%C3%A5-p512349?utm_source=google&utm_medium=organic&utm_campaign=shopping_feed&utm_content=512349&gclid=Cj0KCQiAjc2QBhDgARIsAMc3SqT3fxzn4ZBh3TzVIRJs52SSdTRhNIFhEAbetE-Sqmlh8QuthIEhn0oaAgKsEALw_

3. **Hillerstorp Torpet**, retrieved from <https://www.trademax.se/utem%C3%B6bler/utestolar-tr%C3%A4dg%C3%A5rdsstolar/caf%C3%A9stol-klappstolar/hillerstorp-torpet-klappstol-vitlaserad-furu-p37546>

4. **Gryhyttan A2**, retrieved from https://www.svenssons.se/p/utemobler/tradgardsfatoljer/a2-oljad-ek-varmforzinkat-stativ-ny-/161874?utm_source=google&utm_medium=surfaces&gclid=Cj0KCQjw06OTBhC_ARIsAAU1yOXi3ro13QCKvt9yDKQ2T-pQZCZModB_xGqHGOP2l2wZk72we-MxVYAaAqwCEALw_wcB&gclsrc=aw.ds

5. **Eden Wood Holmsund**, retrieved from <https://edenwood.se/produkt/holmsund-grupp/>

6. **Pall**, retrieved from <https://www.vidaxl.se/e/vidaxl-loungegrupp-med-dynor-4-delar-massiv-furu/8720286474600.html>

7. **Ikea Äppelrö**, retrieved from <https://www.ikea.com/se/sv/p/aeppelroe-pall-utomhus-hopfaellbar-brunlaserad-20204925/>

8. **Biltema Caféstol**, retrieved from https://www.biltema.se/fritid/tradgard/tradgardsmobler/utemobler/cafestol-2000043430?gclid=Cj0KCQjw06OTBhC_ARIsAAU1yOWYp39u4lkgGbJwMLDXqLlakN_Lc_7k1_axrnh3S3uYdjs2b-3gxmlaApl0EALw_wcB

9. **Biltema Plaststol**, retrieved from <https://www.biltema.se/fritid/tradgard/tradgardsmobler/utemobler/plaststol-2000035615>

10. **Acapulco**, retrieved from <https://www.dykeanddean.com/sv/products/original-acapulco-classic-chair-black?variant=37728784769>

11. **Gudhjem**, retrieved from https://jysk.se/utemobler/tradgardsstolar/metall/flatad/stapelstol-gudhjem-svart?gclid=Cj0KCQjw06OTBhC_

12. **Roma Karmstol**, retrieved from https://www.brasommarmobler.se/roma-karmstol-beige-med-beige-dyna?gclid=Cj0KCQjw06OTBhC_

13. **Outl1 Loungeset**, retrieved from <https://outl1.se/litet-loungeset-konstrotting-balkong>

14. **Trademax Hopfällbar**, retrieved from <https://www.trademax.se/utem%C3%B6bler/utestolar-tr%C3%A4dg%C3%A5rdsstolar/positionsstol/hopf%C3%A4llbara-tr%C3%A4dg%C3%A5rdsstolar-4-st-massiv-teak-brun-p1183013-v311502>





oliviajohnsson.com
+46706455276
olivia.h.johnsson@gmail.com

